THE EFFECTS OF INSTRUCTION IN PROBLEM SOLVING TECHNIQUES ON THE CREATIVITY OF SEVENTH GRADE ART STUDENTS IN REGARD TO THEIR IDEA FLUENCY

A Field Report

Presented to

The Graduate Division

Drake University

In Partial Fulfillment

of the Requirements for the Degree

Master of Fine Arts

by

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August 1968

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INTRODUCTION

The period of adolescence in children produces a special need for modification of art education procedures. Many art educators as well as researchers in the area of creativity measurement have noted a drop in the degree of creativity shown by seventh grade students. One characteristic of the drop in creativity appears to be the amount of time it takes for the child to produce a visual communication which is his own. Some of the problem appears to stem from the fact that adolescence is a period of transition. The uncertainties of the age level produce a lack of self-confidence in many students. The spontaneity in art exhibited by elementary pupils declines and a new period of critical awareness takes place. Art educators find that seventh graders are often hesitant to start on a project with which they are unfamiliar because of the fear of failure which "might" occur. In recognizing this characteristic of the early adolescent, the investigator has attempted to offer one method of meeting this problem of building self-confidence.

I. THE PROBLEM

Statement of the problem. The purpose of this study was to create an art program for seventh graders which would strengthen their self-

confidence towards creative activities. The art program was designed to increase the fluency of creative ideas by the students through special instruction in problem solving techniques.

Scope and limitations. Sixty-two students from four intact seventh grade art classes taught by the investigator were used in this study. The subjects in the classes had been selected by computer assignment. All classes in the school were arranged by computer assignment. The method of assignment being as follows. The total seventh grade class was divided into two groups, the upper half and the lower half of the class. The upper half and the lower half of the total class were divided into separate class groups. The students within each classroom group were randomly selected with the exception of the placement of two or three students from the extreme top of the class in each upper half class and the placement of two or three students from the extreme bottom end of the class in each lower half classroom group. A diagram follows illustrating this:

Extremely high students

Upper half of total class -- five classes

Lower half of total class -- five groups

Extremely low students

The two groups of students shown at the extremes were distributed equally in the half of the class they were closest to. In other words, extremely high students were placed only in classes in the upper half of the class, and extremely low students were placed only in classes in the lower half of the total group.

Importance of the study. Research has shown that when early adolescents begin to see the world with more realistic perception they become more critical of their own drawings which do not appear as realistic to them as the actual objects. Many creative activities seem to be affected by this decrease in self-confidence. Art programs need to be developed to meet the needs of this uncertain period of growth. Very little research has been done in this area so far. Most of the research has been concentrated in the areas of elementary art education and art education for academically superior high school students. The world is also in need of people who are able to deal creatively and constructively with many new situations. Since education is not able to supply all the answers for future problems, students must be prepared to think creatively. The research outlined herein involves such a program.

Limitations of the study. Limitations of the study included (1) the short length of time, eight and one-half weeks (2) the number of subjects selected from one school in one geographical area (3) the scheduling of

art classes on a rotating basis, two days one week and three days the next.

II. DEFINITIONS OF TERMS USED

Creativity. Creativity was defined as the freedom of the student to put his own ideas and the views of his world into a unique visual form. A communication to be truly creative must be a product of the individual's own perception of his environment and his imagination. The individual must draw upon a variety of personal resources which are related to the problem to be solved, or though seemingly unrelated, bear on the solution of a given problem which will result in an original product.

Problem. A problem was defined as an obstacle in life recognized by the individual as needing solution. In this study problem refers to an art assignment which requires a solution.

Problem solving. For this study problem solving was the process of finding adequate solutions to art problems encountered by the individual, through a series of steps isolated to help the student employ a systematic method of attacking the problem.

Adolescent art education. Adolescent art education for this study was limited to mean art education in the junior high school seventh grade.

The age characteristics for this group represented typical children ages eleven to thirteen, the expected age range in seventh grade in most schools.

Technique groups. Technique groups were defined as groups of subjects which served as control groups for the study.

Problem solving groups. Problem solving groups were defined as groups of students which served as experimental groups for the study.

Thumbnail sketch. Thumbnail sketch was defined as a small idea sketch done as a preliminary study for a project.

Brainstorming. Brainstorming was defined as a method of obtaining ideas which a group or an individual spoke or wrote down ideas as fast as they came to mind without stopping to judge them critically. Quantity was stressed with the intent that the more ideas produced would result in more good ideas from which to choose.

Composition. Composition was defined as the arrangement of the basic art elements in a given space so that it exhibited balance and aesthetically pleasing form.

Basic elements of design. Basic elements of design were defined as: line, color, value, texture, form, shape, and space.

Art expert. An art expert for the purposes of this study was defined as a person holding at least a Bachelor of Fine Arts degree in art or art education. The person must have had teaching experience and be judged by the investigator as both a highly competent art teacher and a practicing artist.

Gestalt judgment. Gestalt judgment for this study was defined as the "subjective evaluation of art products by art 'experts'."[1] This evaluation encompassed the whole product and was not limited to judgment of one aspect of the work. That is, the product was viewed for total effect of the bringing together of art elements.

III. ORGANIZATION OF THE REMAINDER OF THE FIELD REPORT

The remainder of the field report is divided into four chapters. Chapter two discusses the related literature in the areas of creativity, problem solving, and adolescent art education. Chapter three describes the groups used in the study and the methods of selecting and using the materials involved. Chapter four describes and analyzes the data collected during the study, and a cross check of the data is presented. Chapter five contains a summary of the study; conclusions drawn from

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[1]Herbert J. Burgart, "Art in Higher Education: The Relationship of Art Experience to Personality, General Creativity, and Aesthetic Performance," Creativity and Art Education (Washington: National Art Education Association, 1964), p. 68.

the analysis; limitations of the study and implications for further research in the area of idea fluency. Bibliographical material is listed. The appendixes present materials used in the data collection and research projects which the researcher felt was necessary to include.

CHAPTER II

REVIEW OF THE RELATED LITERATURE

A review of the literature in the areas of creativity, problem solving and adolescent art education revealed a growing interest on the part of art educators and educators in general in the significance and importance of a problem solving approach to education. This approach appears to be growing in importance because of the nature of our world today. With the interest in space exploration and the further exploration of man himself through science there is a compelling need to educate man in such a way that he is not only unafraid of tackling the unknown, but is equipped mentally to do so through practice. In this study the investigator dealt with the relationship of problem solving to the creativity of the junior high school adolescent.

I. CREATIVITY LITERATURE

A search of literature which pertained to creativity revealed that much research had been done in that area. However, a great deal more research needed to be done particularly related to the nature of the creative process itself. Many researchers admitted that although they had been able to pinpoint some characteristics which creative people possessed they could not identify these people easily through any tests which have at this point been developed.

In 1950, Dr. J. P. Guilford at a meeting of the American Psychological Association, at which he was inaugurated as President, devoted his address to the lack of interest in education in developing creativity.[1] He and his associates at the University of Southern California in their Aptitudes Research Project, have since done a great deal of research into the nature of creativity and how it can be measured. Guilford and associates have defined what they call a "creativity quotient" which differs from the intelligence quotient (IQ) and must be assessed apart from it. They have developed a series of tests which have begun to give clues as to certain qualities which are evident in people who appear to be creative.

In a speech April 26, 1968 at Iowa State University, which the investigator attended, Guilford said, "Creativity is a part of intelligence, yet not a part of intelligence if it is measured verbally as we do now assess intelligence." He went on to say that intelligence is not a sufficient reason for a person to show high creative productivity. The IQ test, he reminded the audience, is a test to measure the amount of information in the individual's memory store. Guilford stated that education appears to have somehow put inhibiting forces on students

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[1]Alex Osborn, Applied Imagination: Principles and Procedures of Creative Problem Solving (New York: Charles Scribner's Sons, 1965), p. ix.

so that they do not develop the creative procedures they need to know. He stressed the need for the schools to develop each students ability to use the information they are taking in, creatively. At this time in our society we have many people who are what he called, "creative underachievers." The answer he felt was for our educational system to provide plenty of opportunity for productive activity and not just fact gathering. Guilford believes, as have many other researchers, that special practice may improve the ability to think creatively in children as he said research has shown true in adults. He said that curriculum choices have important bearing on the development of both intelligence and creativity.

Other researchers such as Dr. E. Paul Torrance, formerly of the University of Minnesota Bureau of Educational Research and now of the University of Georgia are also developing instruments to identify creativity in people of all ages.

Creativity definitions. What is this attribute called creativity? Lots of people are talking about it. Brewster Ghiselin states that, "The term creativity has become too popular."[1] At random from the many definitions of creativity encountered during this research, the following

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[1]Brewster Ghiselin, The Creative Process (New York: A Mentor Book Published by the New American Library, 1960), p. 5.

statements are cited as giving a feeling for what is being investigated:

Clark Moustakas: "To be creative means to experience Life in one's own way, to perceive from one's own person, to draw upon one's own resources, capacities, roots."[1]

Dr. E. Paul Torrance: ". . .the process of sensing gaps or disturbing missing elements; forming ideas or hypotheses; and communicating the results, possibly modifying and retesting the hypotheses."[2]

Helen Merritt: "We can think of creativity as the process of taking something at hand and projecting from it a new form that did not previously exist."[3]

John Ciardi, (poet) "Creativity is the imaginatively gifted recombination of known elements into something new." (Quoted in: What Every Writer Must Learn," John Ciardi, Saturday Review, 15 December, 1956, p. 7)[4]

June King McFee: "Creativity is the ability to invent new symbols and ideas, to improvise on established symbols, to rearrange established organizations into new organizations, and to integrate new or borrowed ideas into previously organized systems or situations."[5]

Lark-Horovitz, Lewis and Luca in their book, Understanding

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[1]Clark Moustakas, Creativity and Conformity (New Jersey: D. Van Nostrand Company, Inc., 1967), p. 27.

[2]E. Paul Torrance, Guiding Creative Talent (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963), p. 16.

[3]Helen Merritt, Guiding Free Expression in Children's Art (New York: Holt, Rinehart and Winston, 1964), p. 7.

[4]Sidney J. Parnes and Harold F. Harding, A Source Book for Creative Thinking (New York: Charles Scribner's Sons, 1962), p. 3.

[5]June King McFee, Preparation for Art (San Francisco: Wadsworth Publishing Company, Inc., 1961), p. 2.

Children's Art for Better Teaching, list three questions which psychologists and educators have been asking about creativity: (1) what is the creative process, (2) what are the unique characteristics of highly creative individuals, (3) what factors in the environment facilitate or inhibit creative behavior.[1] The investigator will discuss these questions and then assess the role of education in the development of creativity.

The creative process. The creative product is tangible and has received more attention than the creative process because it was easier to assess. Researchers are now turning to an analysis of the process itself trying to find clues to why one person is better able to use his creative ability than another. The process is difficult to deal with because of its intuitive quality. Helen Merritt states that, "The creative process is not entirely rational. It makes jumps that may not be logically tenable."[2] Reinhold Niebuhr said there was, ". . .an elusive quality in the creative individual which defies analysis and imitation."[3] Only limited attempts have been made to assess it because of the nature

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[1]Betty Lark-Horovitz and Hilda Present Lewis and Mark Luca, Understanding Children's Art for Better Teaching (Columbus, Ohio: Charles E. Merrill Books, Inc., 1967), p. 166.

[2]Merritt, op. cit., p. 17.

[3]James Webb Young, A Technique for Producing Ideas (Chicago: Advertising Publications, Inc., 1962), Forward, no page number.

of the creative process.[1]

What are some factors which may bear on this unique individual quality which is hard to assess? Jean Williams suggests that each culture's values, concepts of life, and resources play key roles in the release of creative ability in that culture.[2] She further states that beyond the cultural implications of this question.

> The thing that sets creativity apart is that it calls upon each individual to reveal something of himself; his ideas or ideals, his dreams and longings, his imagination, or his notion of order and beauty.[3]

In regard to creative art products Merritt said, "A creative work whether it is by a child or a great master is a product of the individual's inner and outer experience."[4] The role of impulse is bound up with the background, experiences and perceptions of each individual. Although there are a variety of steps which can be identified in the solving of a problem or the creation of a new product there is a sudden coming together of experience and problem resulting in insight. It appears that the answer has come out of nowhere but the subconscious has gone

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[1]Torrance, op. cit., p. 17.

[2]Jean Williams, "Why Creativity in Education," School Arts, LVII (February, 1958), 19.

[3]Ibid.

[4]Merritt, op. cit., p. 15.

to work on the problem during the necessary incubation period. And yet the product is only, ". . .A fragmented picture of where he has been, but not who he is or where he is going."[1]

One way of studying the creative process has been to study the work of people recognized to have had successful creative experiences, resulting in some unique product. Brewster Ghiselin, for example, in his classic, The Creative Process,[2] an anthology of the opinions and writings of artist, scientists, musicians, etc., selected enlightening discussions of each persons development of their unique discoveries or products. Recently such people as Dr. E. Paul Torrance and Dr. J. P. Guilford have tried to assess, in people of all ages, what characteristics comprise the creative process and how it can be identified and better fostered.

The ability to imagine, to build and sustain a certain amount of fantasy is part of the creative process.

> The term "fantasy" implies the assembling of perceptions which no longer bear close resemblance to reality, but are freely grouped and fused in unprecedented manner.[3]

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[1]Moustakas, op. cit., p. 3.

[2]Ghiselin, op. cit.

[3]Manfred L. Keiler, The Art in Teaching Art (Lincoln: University of Nebraska Press, 1961), p. 26.

Manfred Keiler also said,

> People rarely stop to consider that most great ideas, important inventions, and enduring artistic creations first were conceived as intangible images in the mind of man.[1]

In the mind of man is stored all that he is, all that he has seen and experienced and his relation to these based on the way he has fit them together in his mind and conscious. If education is to prepare the individual to use and free the creative process to bring forth new ideas and unique products it must help the individual to greater self-confidence and trust in what he thinks. This education should prepare the individual with tools of assistance. The section concerned with problem solving literature will discuss some of these tools. Al Hurwitz sums this up by saying:

> If you are asking for a consensus of educators, I would say we want them to be flexible in their thinking, spontaneous and divergent when the occasion calls for it; that they be able to synthesize many areas of information, that they not be afraid of the unknown, and that they eventually see that these factors are related to the kind of self-renewal which makes education a way of living.[2]

Characteristics of creative individuals. People who have been regarded as creative appear to have some common characteristics. These characteristics are important personality factors in creative achievement.

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[1]Keiler, op. cit., p. 25.

[2]Al Hurwitz, "Creativity--An Interior Dialogue/Some Questions Towards a Synthesis," School Arts, LXV (January, 1966), 30.

One characteristic of creative people is their willingness to change their thinking. J. P. Guilford said in regard to flexibility:

> . . .Creative thinkers are flexible thinkers. They readily desert old ways of thinking and strike out in new directions. . . In the area of creativity one should certainly expect to find a trait of originality.[1]

They adapt their thinking to changing conditions and are not rigid and stereotyped. Hurwitz quoting Maslow said, they have, ". . .traits of spontaneity and openness to experience."[2]

Creative thinkers are fluent. They are able to generate large numbers of ideas.

> Fluency refers to the ease with which ideas are generated. Fluent thinking is demonstrated by the number of ideas suggested in a given period of time.[3]

Attempts to measure rates of fluency have been carried out by both J. P. Guilford and E. Paul Torrance. Guilford and Torrance presented activities which called for thinking of as many ideas as possible within a given time limit. Guilford stated that:

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[1]J. P. Guilford, Creativity and Its Cultivation (New York: Harper and Brothers (ed. by Harold H. Anderson, 1959) quoted p. 2. Preparation for Art, June King McFee.

[2]Hurwitz, op. cit., p. 32.

[3]Lark-Horovitz, Lewis and Luca, op. cit., p. 167.

> Fluency, for example, is largely a matter of retrieval of information from one's memory store and comes under the historical concept of recall of learned information.[1]

However, for this field report the following explanation referring to ideational fluency better related to what was being examined, "In this case it is not a matter of calling up words but of generating ideas, however they may be expressed in words."[2] Viktor Lowenfeld said further that:

> Ideational fluency appears to be related to impulsiveness, self-confidence, acendence, greater appreciation of originality, and inclanation away from neuroticism.[3]

Another characteristic of creativity is the ability to be able to live amid seeming chaos and disorder, to bring, as Calvin W. Taylor said, ". . .a more profound order."[4] Within this temporary disordered state the individual seeks to work with ideas and possible solutions until one most appropriate for the situation is selected and brings about the order the individual is seeking. He is able while wrestling with the problem to see somewhere in the distance an ultimate solution.

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[1]Sidney J. Parnes, Creative Behavior Guidebook (New York: Charles Scribner's Sons, 1967), p. 270.

[2]Viktor Lowenfeld (ed.), "The Meaning of Creativity," Eastern Arts Association Research Bulletin, V (March, 1954), p. 6.

[3]Torrance, op. cit., pp. 65-66.

[4]Lark-Horovitz, Lewis and Luca, op. cit., p. 4.

Problem sensitivity is another important factor in creativity. It is the ability to sum up a situation and select problems which need to be solved. This includes the desire and the ability to disturb the seeming order of a situation to effect a necessary and perhaps intuitively sensed change. The creative thinker is a divergent thinker and this enables him to see situations from several viewpoints, some of which differ from what may normally be sensed or accepted.

Many creative individuals are not understood or given adequate attention in school because of their divergent responses to given situations. A student who is said to be "unruly" may merely be expressing his own perception of a situation. Because this perception does not agree with the teacher's opinion and perhaps threatens his position of authority the student is labeled a "troublemaker." Frank Barron discussing creativity research in the March, 1961 NEA Journal, comments on this:

> At a minimum what these findings seem to say to us is that we are too much inclined to reward docility and niceness in our students and that the independent, offbeat, and sometimes unruly students whom we are much inclined to undervalue and deplore, often may have the greatest potential for creative achievement.[1]

Many divergent qualities found in creative individuals are to be found listed in E. Paul Torrance's book, Guiding Creative Thinking.[2]

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[1]Frank Barron, "Creativity, What Research Says About It," NEA Journal, L (March, 1961), 19.

[2]Torrance, op. cit., p. 66.

One of the characteristics is risk taking which Torrance said is, ". . . essential in the development of the self-concept."[1] For, he said, "One cannot know what he is capable of unless he tests his limits."[2] This testing of limits is a basic ingredient of independence and, ". . . independence is a necessary characteristic of the creative personality."[3]

Environment needed to encourage creativity. The environment in which creativity flourishes appears to rely heavily on the type of personality controlling a given situation. In the educational system the teacher is the controlling authority in the classroom and sets the stage for or against creative behavior. What is needed to foster creativity is a teacher who is confident enough in himself as a person and accepting enough to allow the student to voice his own opinions in a climate of acceptance. The basic American concept of the worth of the individual must be present. Art educator, Victor D'Amico, has said creative imagination,

> . . . can be developed and enriched by broadened experience and skillfull guidance or it can be atrophied or destroyed by neglect or indoctrinary teaching.[4]

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[1]Torrance, op. cit., p. 73.

[2]Torrance, loc. cit.

[3]Torrance, op. cit., p. 14.

[4]Victor D'Amico, "Sesame of Creative Expression," School Arts, LIII (September, 1953), 9-10.

The teacher needs to be an encouraging catalyist providing an educational program which allows for flexibility. According to Lark-Horovitz, Lewis and Luca:

> Too much direction deprives children of the opportunity to figure things out for themselves, to try out their own ideas, to act on the basis of their own curiosity and desires.[1]

This statement also implies that the student is free to fail and to learn from his failures so that he sees failure as a challenge rather than as a threat.

Role of education in developing creativity. Since the end of World War I, the trend in education has been away from authoritarian fact finding education toward an emphasis on the creative development of the individual.[2] Anthropologist Margaret Mead, Jerome Bruner, Dr. James Conant, and others are recognizing the special needs of our age and are striving to improve education of our citizens for the unknown events of the future. The evidence of the need for special preparation are brought out especially through the research being done related to space exploration. It is perhaps that it is a matter of our survival in this rapidly changing world, that makes it necessary for us to place

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[1]Lark-Horovitz, Lewis and Luca, op. cit., p. 174.

[2]Bryce B. Hudgins, Problem Solving in the Classroom (New York: The Macmillan Company, 1967), p. iii.

greater emphasis on adapting to change. Education in the early days of America was largely rote memorization of facts with little, if any, allowance for individual interpretation. Even in art, students spent most of their time copying tight geometric designs from the blackboard. Individual observations and drawings were thought unimportant and out of place in the nations schools. Jean Williams has said today:

> We must have a renewed emphasis on the creative in education to meet the challenge of the times. It is in the creative act that the child finds himself. It is through creativity that nations find progress.[1]

And Ernest Hilgard cited the need for giving creative education to all people as not a "limited" program for the highly gifted, but as "the birthright of every person of average talent," as well.[2] And Al Hurwitz said, ". . .we have begun to realize that our country cannot afford to waste untapped resources among our future citizens."[3] Williams in her article on creative education gave four reasons for thinking creativity essential to education. Her reasons were:

> 1. First, it is through creative outlets that the teacher has a window into the child's mind.[4]

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[1]Williams, loc. cit.

[2]Ernest R. Hilgard, "Creativity and Problem Solving," Creativity and Its Cultivation, Harold H. Anderson (ed.) (New York: Harper and Brothers Publishers, 1959), p. 162.

[3]Hurwitz, loc. cit.

[4]Williams, loc. cit.

2. The second reason I believe creativity essential to education is that it is through creative outlets that our senses become more acute.[1]

3. The third reason I believe creative expression essential is that the creative process develops habits of thought.[2]

4. The fourth reason I believe creativity essential is that in order to learn to one's fullest potential; indeed, in order to live effectively, we must find ourselves.[3]

Some conditions for creativity have already been discussed. A special effort in education needs to be made to prepare a sufficient number of teachers qualified and suited to perpetrate creative education. Our educational system needs also to make provisions for the reeducation of older teachers who may not have been trained in current philosophy. Administrators need to be alert to the philosophical leanings of their teachers which bear on their teaching methods. Teachers with outdated methods stiffle creativity in children. These teachers need to up-date their methods in order to help each child to be his best. All of education working together is required in this effort. Williams cited the kind of teacher needed:

> I have seen teachers who through creative activities which could be acceptable on any level of thought, helped children gain enough self-confidence that they could drop the mental barriers that fear had built up.[4]

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[1]Williams, op. cit., p. 20.

[2]Ibid.

[3]Williams, op. cit., p. 21.

[4]Ibid.

This kind of teacher prepares the student to accept failure as well as success. Torrance has pointed out that:

> American education prepares only for victory or success and not for possible frustration or even failure.[1]

He has also emphasized the necessity of training creative thinking abilities so that they ". . .do not remain underdeveloped or paralyzed,"[2] because he said, "If their functioning is impaired, one's capacity for coping with life's problems is indeed marginal."[3]

A great deal more research into the nature of creativity is needed so that education can modify its programs to prepare students to meet the needs of the future.

II. PROBLEM SOLVING LITERATURE

Literature in the field of problem solving is vast. The Creative Education Foundation in particular has helped to compile and distribute materials relating to the area of creative problem solving. The membership brochure of the Foundation stated that it was founded in 1954 by Alex F. Osborn, "a man who was seriously concerned about the difficulty and urgency of more fully releasing creativity and problem solving ability

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[1]Torrance, op. cit., p. 14.

[2]Torrance, op. cit., p. 3.

[3]Torrance, op. cit., p. 4.

[4]Sidney J. Parnes and Harold F. Harding, A Source Book for Creative Thinking (New York: Charles Scribner's Sons, 1962).

in the individual human being." The foundation is an affiliate of the State University College (Buffalo) and one of its leaders, Dr. Sidney J. Parnes, and Harold F. Harding of the Ohio State University have been prominent figures in the creation of Creative Problem Solving classes. Parnes and Harding edited, A Source Book for Creative Thinking[1] which was the major inspiration for the research in this field report. A Source Book for Creative Thinking is primarily a compilation of research and programs in creative thinking which have come about since 1950. The book does however, put the concern in historical perspective and offer some background in the development of Creative Problem Solving courses.

Problem and problem solving definitions. Gail Inlow has seen problem solving as ". . .no more and no less than a planned posture before a life situation."[2] This posture would be a method of attacking an unknown element in life or as Bryce Hudgins has said a manner of dealing with a problem which is said, ". . .to exist when the learner's previous knowledge or patterns of behavior are insufficient or inappropriate

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[1]Sidney J. Parnes and Harold F. Harding, A Source Book for Creative Thinking (New York: Charles Scribner's Sons, 1962).

[2]Gail M. Inlow, The Emergent in Curriculum (New York: John Wiley & Sons, Inc., 1966), p. 104.

to enable him to provide an acceptable solution."[1] Hudgins also said:

> Problem solving is not a method of teaching. It is a general attitude, a disposition toward inquiry which has as its goals the development of new ideas based upon older ones and the seeing of intellectual light where darkness lay before.[2]

The idea of problem solving being an attitude has been reflected in much of the problem solving literature. The whole aspect of problem solving is surrounded by an attempt to help individuals become more aware of their internal and external environments. Unless there is an awareness of a problem to solve, the individual will not feel the need to seek a method of solving it.

Importance of problem solving in education. Hudgins in his study of problem solving in American education discussed education in the early part of this century.

> . . .The schools were characterized by a dogged insistence upon rote memorization of textbooks and factual lists often of great length which possessed little meaning for the pupil who was required to master them.[3]

There was little or no allowance made in education for the development of creative thinking. Parnes and Harding attributed this slowness to change in part to the fact that:

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[1]Hudgins, op. cit., p. 1.

[2]Ibid., p. iv.

[3]Ibid., p. iii.

> Human nature resists change, and the "bold innovator" has seldom been a popular hero in his lifetime. Unfortunately, this reluctance to explore the new has deep roots in the field of education.[1]

Finally, to quote Hudgins again:

> For many reasons, not all of which are known even today, and which in any event cannot be related here, the curriculum and goals and methods of instruction changed drastically in the aftermath of World War I. New emphasis was placed upon the development of educational tasks that were more consistent both with our growing knowledge about child development and with the spirit of a democratic society. One aspect of this "new education" was a heightened concern with modifying instruction in ways that are consistent with the development of pupils' intellectual abilities, foremost among which was problem-solving skill.[2]

It is important to teach people how to think. The National Education Association voices the change in educational philosophy from the beginning of the century when it said in the findings of a commission appointed by them to define the goals of education:

> The purpose which runs through and strengthens all other educational purposes--the common thread of education--is the development of the ability to think.[3]

This current philosophy indicates that it is the responsibility of all educators to teach students how to think. Parnes and Harding said:

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[1]Parnes and Harding, op. cit., p. vi.

[2]Hudgins, loc. cit.

[3]Osborn, op. cit., p. xviii.

> We urge educators to recognize creative thinking as at least equal in importance to any other subject. Indeed, it should be the means of breathing new life into all others.[1]

Many teachers still feel that their job is to fill students with facts and that the student should be able to get the "right" answer at all times. Problem solving educational philosophy is based on the premise that it is necessary to test problem solutions by trial and error approach. Educators need to help students to see that every attempt to solve a problem is not met with success. Lark-Horovitz, Lewis and Luca have said, "They need to learn to face the possibility of failure in undertaking tasks that are significantly challenging."[2] They also stated that, "Art offers an excellent opportunity for helping children to understand that in some areas of life there is not just one right answer which makes all other answers wrong."[3] Teachers in all subjects need to set up opportunities for their students to solve problems related to their work and to life situations. Hudgins stated that:

> The teacher who holds the development of problem solving skill as an important instructional objective will behave differently than a teacher who does not have a similar goal.[4]

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[1]Parnes and Harding, op. cit., p. v.

[2]Lark-Horovitz, Lewis and Luca, op. cit., p. 173.

[3]Ibid., p. 171.

[4]Hudgins, op. cit., p. 1.

Merely giving teachers a suggested set of steps to follow is not enough. The teacher must be able to inspire students to seek solutions for themselves. The teacher himself must demonstrate an attitude toward life which is full of curiosity and inquiry. Gail Inlow placed the goals of problem solving education in these words:

> There are no magic properties, per se, in the method itself. Problem solving does not enable the ignorant to make sophisticated discoveries, the unprepared to postulate at a high level, or the inept and uninformed to conclude maturely. Such an expectation would be naive as well as specious. The more customary outcome, instead, is for learning content and the problem-solving process to reinforce each other. The more extensive the background of preparation, the more refined the process of problem identification, postulation, application, and evaluation. Conversely, the more effective the utilization of the problem-solving process, the more extensive the ultimate store of knowledge and its meaning. [1]

The mention of an "extensive background of preparation" points up the necessity for the whole field of education to adopt a problem solving attitude.

The value of problem solving courses. Many problem solving courses particularly at the university level have been developed since 1950. One of the first and most successful was the problem solving course at the University of Buffalo conducted by Dr. Arnold Meadow and Dr. Sidney J. Parnes. Meadow and Parnes conducted studies over a period of fourteen months in the early 1960's using 330 students as

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[1] Inlow, op. cit., p. 104.

subjects.[1] "According to this scientific test, those who had taken courses were able to average 94% better in production of good ideas than those without benefit of such a course."[2] A battery of ten tests was given during the fourteen months. "One test revealed a substantial improvement in personality traits as well as in creative ability."[3] This problem solving research at the University of Buffalo, ". . .was the first full-scale attempt to cover improvement in creative ability."[4] Art educator Viktor Lowenfeld felt that art education and courses to improve problem solving abilities had a great deal in common which could be of mutual benefit. Parnes speaking of Lowenfeld's attitude toward problem solving said:

> Viktor Lowenfeld had strong feelings about this. He felt that creative problem solving programs might both be strengthening the same talent--that both courses of instruction might develop creativity which can carry over to other fields of endeavor.[5]

The general aspects of development of thinking in the problem solving courses show the widespread conviction that methods of creative thinking are similar for many fields. They indicate that the artist, the

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[1]Osborn, op. cit., p. iii.

[2]Ibid.

[3]Ibid., p. xiii.

[4]Ibid.

[5]W. Lambert Brittain (ed.), Creativity and Art Education (Washington, D.C.: National Art Education Association, 1964), p. 44.

scientist, the writer, all appear to use similar patterns of thought as applicable to their own disciplines. Methods of learning to think better is what is being dealt with in problem solving courses. Inlow said in discussing the "teachability" of problem solving:

> Any process as much a part of daily living as problem solving demands answer to the important question: To what extent is it a process that one can teach another? And because thinking permeates every facet of problem solving, this is really another way of asking to what extent thinking itself capable of being taught. Addressing ourselves to this latter question and slanting it to the teacher-learner relationship at any level, we conclude that thinking may be taught in these three ways: (1) by a teacher's removing the blockages which stand in the way of learning, (2) by a teacher's stimulating an environment of learning, and (3) by a teacher's helping a learner to proceduralize his thinking. [1]

Alex Osborn thought that, "Courses in creative problem-solving can be especially helpful since they not only develop the ability to think creatively but also they instill the urge to act creatively." [2] Creative problem solving courses appear to be useful stepping stones to greater utilization of creative thinking abilities, and deserve great attention in the education of individuals in our society. This ability to think creatively has been called, "the greatest of all natural resources," [3] by Carl H. Grabo. Mr. Grabo feels we are far from doing enough in our civilization to develop this resource. [4]

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[1] Inlow, op. cit., p. 99.

[2] Osborn, op. cit., p. xix.

[3] Parnes and Harding, op. cit., p. vi.

[4] Ibid.

Idea production--steps in problem solving. Various people have attempted to isolate the steps in problem solving. John Dewey and Graham Wallas are among the best known. John Dewey in 1910 listed the following as steps in problem solving:

1. A difficulty is felt.
2. The difficulty is located and defined.
3. Possible solutions are suggested.
4. Consequences are considered.
5. A solution is accepted.[1]

Aschner and Bish have listed Dewey's steps in a different form, calling them stages of problem solving:

1. Recognition of a problem.
2. Analysis of the problem.
3. Suggestion of possible solutions.
4. Testing of the consequences.
5. Judgment of the selected solution.[2]

D. H. Johnson in 1950 simplified Dewey's steps to three: "preparation, production and judgment."[3] Graham Wallas has been cited by Guilford as having a classical model in 1926 as follows:

1. Preparation (information gathered in)
2. Incubation (unconscious work is going on)
3. Illumination (inspired solutions emerge)
4. Verification (solutions are tested and elaborated)[4]

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[1]J. P. Guilford, The Nature of Human Intelligence (New York: McGraw-Hill, 1967), p. 313.

[2]Mary Jane Aschner and Charles E. Bish, Productive Thinking in Education (Washington, D. C.: National Education Association, 1965), p. 8.

[3]Guilford, loc. cit.

[4]Guilford, loc. cit.

In 1931 J. Rossman isolated seven steps in problem solving from his study of seven hundred productive inventors, The Psychology of the Inventor. His steps were:

1. Observation of a need or difficulty.
2. Analysis of the need.
3. Survey of the need.
4. Formulation of objective solutions.
5. **Critical analysis of the solutions.**
6. The birth of a new invention--the idea proper.
7. Experimentation to test the idea.[1]

Alma Bingham in 1958, in a book called Improving Children's Facility in Problem Solving, discussed the problem solving process as related to elementary school students. These steps relate also to junior high school students:

A. A problem is identified.
B. The problem is clarified.
C. Information germane to it is collected.
D. This information is organized and focused on the problem.
E. Possible satisfactory solutions are postulated.
F. The best, from these, is selected.
G. The solution is put into operation.
H. The case is closed if the individual is satisfied; if not, he pursues it further.[2]

Alex Osborn in 1964 said that, "The creative problem-solving process ideally comprises these procedures: (1) Fact-finding. (2) Idea-finding. (3) Solution-finding."[3]

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[1]Aschner and Bish, op. cit., p. 8.

[2]Inlow, op. cit., pp. 96-97.

[3]Osborn, op. cit., p. 86.

In regard to the steps in problem solving specifically in art, Hiram Williams, painter, has observed the process as follows:

> The good painter also understands the creative process. He expects the following pattern to be commonplace: a mulling over of the ideas; a gestation of the ideas over a period of days, months, or years; the reappearance of the idea from the lower reaches of the mind; the attempt to embody the idea, now fully formed, through the medium; the finding of his intention (what idea plus the medium looks like); the visualization of his intention, which is his statement--the finished painting. Some people call this "self-expression."[1]

He also said:

> It is to be noted that a painting is not arrived at straight on by simple transference of idea from mind to canvas. The painting is achieved obliquely through an encounter, a kind of dialogue with the medium and surface while the painter is trying to pin down the idea.[2]

As can be noted in the descriptions above the steps in problem solving follow similar patterns and have been in use for most of this century.

Useful problem solving techniques. Great interest is being shown in industry, business, education and all areas of society in ways of increasing creative potential. Many individuals particularly in industry and at the university level have been engaged in developing techniques which are useful in helping to develop new ideas. A creative technique

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[1]Hiram Williams, Notes for A Young Painter (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1963), p. 16.

[2]Ibid.

is said to be, ". . .anything that will give or lead us to a fresh viewpoint."[1] Robert J. Tiernan, Creative Director of Better Homes and Gardens Magazine and instructor of creative problem solving classes at Drake University, in a speech which will be quoted in some detail later, has said that, ". . .the average person uses only about 10% of his creative potential."[2] This fact emphasizes the need for developing techniques for releasing the other 90% of the potential. Sidney J. Parnes in his Creative Behavior Guidebook lists two purposes for instruction in problem solving techniques:

> Hence, the fundamental purpose of a program to nurture creative behavior is to facilitate the effective use of a person's associative abilities. An individual can increase the number of his associations in two general ways: (1) feed his brain the fuel required for it to operate at full capacity and (2) remove the brakes that stop his associative mechanisms from functioning naturally.[3]

The techniques which will be discussed are suggestions for improving creative ability. Originators of techniques emphasize the necessity for each individual to modify the techniques to best suit their needs. They also advocate that no one technique is thought to be best. They point out

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[1]Jack D. Summerfield and Lorlyn Thatcher, The Creative Mind and Method (Austin, Texas: University of Texas Press, 1960), p. 34.

[2]Robert J. Tiernan, "How to Hatch Fresh Ideas," Better Homes and Gardens (January 25, 1968). (Mimeographed speech.)

[3]Sidney J. Parnes, Creative Behavior Guidebook (New York: Charles Scribner's Sons, 1967).

that the technique must be suited to the particular needs of the situation. John Arnold said, that the techniques are aids:

> The approaches suggested in this chapter are not sacred and they should be modified and changed to fit the individual needs of the person using them. They are not the one right answer.[1]

Most of the problem solving techniques are based on the Alex Osborn assumption that in solving a problem, "The more ideas you think up, the more likely you are to arrive at the potentially best leads to solution."[2] "QUANTITY BREEDS QUALITY."[3] Osborn also added:

> The piling up of tentative ideas is an indispensable part of any problem-solving project, whether it be in creating a new drug, or in correcting the behavior of one's child. Almost always we have to think up a number of unusable ideas in order to arrive at one that may work.[4]

Blocks that need to be overcome in order for the individual to be able to produce large numbers of tentative solutions have been listed briefly by Parnes as follows:

A. Habits, conventions and conformity.
B. Ideas often rejected.
C. Reasons ideas not offered.[5]

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[1]Parnes and Harding, op. cit., p. 252.

[2]Osborn, op. cit., p. 124.

[3]Ibid.

[4]Ibid., p. 117.

[5]Parnes, op. cit., p. 138.

Tiernan in a speech called "How to Hatch Fresh Ideas," outlines twenty-one ways to get more ideas:

1. Take notes.
2. Budget time for thinking.
3. Develop confidence in your creative ability.
4. Develop an attitude of "constructive discontent."
5. Re-awaken your curiosity.
6. Become more flexible in your approach to problems.
7. Pick your best place for thinking.
8. Set deadlines for yourself.
9. Set quotas to be met.
10. Break your regular habits.
11. Learn to observe.
12. Learn to listen.
13. Take up some creative hobbies.
14. Use your spare time wisely.
15. Build up your idea bank.
16. Start an idea book.
17. Learn to suspend judgment while you are creating.
18. Don't overlook the obvious.
19. Learn techniques like -
    Brainstorming
    Checklists
    Attribute listing.
20. Try your ideas.
21. Practice, practice, practice.[1]

The researcher has selected ten problem solving techniques for definition, from research for this review of literature. The first technique is called the Deferred Judgment Principle.[2] Osborn said that, "In idea finding we instinctively tend to judge too soon."[3] This

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[1]Tiernan, op. cit.

[2]Parnes and Harding, op. cit., p. 187.

[3]Osborn, op. cit., p. 128.

principle takes this tendency into consideration:

> In essence this principle calls for the deliberate separation of idea-production from evaluation. In other words, during the effort to generate ideas, the judicial process is deliberately suspended--evaluation of ideas is deferred until later so as to allow full play to imagination.[1]

The principle is a part of other techniques, such as, brainstorming, checklisting, attribute listing, etc. Parnes said that:

> . . .when we stress the term defer judgment (sic), we emphasize the relaxation from anxiety or concern as to the value, acceptability or appropriateness of our ideas.[2]

He felt that deferred judgment counteracts the ". . .inhibiting of impulse action based on pre-judging (prejudice)."[3]

Osborn cited studies which have been made concerning deferred judgment and concluded that:

> . . .when individuals adhere to the principle of deferred judgment they generate almost twice as many good ideas as when they allow judgment concurrently to interfere.[4]

The second technique is called Idea Spurring Questions. Parnes said, about Arnold's theories:

> One creative attribute the author stresses is the questioning mind. Arnold is a great believer in the values of the art of asking good questions.[5]

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[1]Parnes and Harding, loc. cit.

[2]Parnes, op. cit., p. 67.

[3]Ibid.

[4]Osborn, op. cit., p. 129.

[5]Parnes and Harding, op. cit., p. 127.

John Arnold also said:

> Questioning is basic and fundamental. The creative process starts with a question. It is continuously fed by questions and often the prediction itself is more of a question than it is a statement. Einstein was questioned shortly before he died by a young Princeton student, "What was the most important attribute of the successful innovator?" Einstein answered without hesitation that it was an insatiable curiosity, a driving spirit of inquiry.[1]

Probably the best known list of idea spurring questions is the one developed by Alex Osborn which can be found in Appendix E. Although various people have devised checklists of different sorts, John Arnold believed that:

> Probably the best check list, as far as any individual is concerned, is the one that he makes up for himself.[2]

Arnold felt that each person should devise a checklist and memorize it and use it. A third technique called checklisting[3] is based on the principle of asking questions and Osborn's list overlaps here in use of lists to spur thinking.

The fourth technique is an interesting one called, Attribute Listing. This technique was developed by Robert Crawford at the University of Nebraska. Its major use has been the improvement of products. It stresses looking at a problem from several viewpoints.

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[1] Parnes and Harding, op. cit., p. 130.

[2] Ibid., p. 254.

[3] Ibid., p. 253.

> In this technique Crawford lists the attributes of various objects or the specifications or the limitations of certain need areas and then by changing or modifying one or more of the attributes or specifications, he brings originally unrelated objects together to form a new combination that better satisfies his needs.[1]

A more specific example of attribute listing is cited here:

> For example, in considering other uses for an object, such as a piece of paper, students are taught to look at each attribute of the paper, such as its whiteness, its four corners, its straight edges, etc. Each of these attributes then suggest a number of possible uses.[2]

A more complex version of checklisting and attribute listing called Morophological Analysis has been developed by Fritz Zwicky of Aero-Jet Corporation. It is structured in a model cube form similar to Guilford's Structure of the Intellect.[3] More information can be gained from it by reading about it in A Source Book for Creative Thinking.[4] The researcher felt that it was too complex for junior high school implementation, but felt it necessary to draw the reader's attention to its presence as a technique.

A sixth technique is called, Forced Relationships. It was developed by Charles S. Whiting who defines his "Forced Relationships" as:

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[1]Parnes and Harding, op. cit., pp. 254-255.

[2]Ibid., p. 308

[3]Ibid., p. 161.

[4]Ibid., p. 255.

> . . . techniques for inducing original ideas which rely upon the creation of a forced relationship between two or more normally unrelated products or ideas as the starting point for the idea-generation process.[1]

A seventh technique which can be used individually as well as in the more commonly used group implementation is Brainstorming. Parnes defined it this way,"Brainstorming is the name given to a group session when it is adhering to the principle of deferred judgment."[2] The technique has four basic rules which must be adhered to:

1. Criticism is ruled out. Judgment is suspended until subsequent evaluation.

2. Free-wheeling is welcomed. The wilder the ideas the better; it is easier to tame down than think up.

3. Quantity is wanted. All other things being equal, the greater the number of ideas, the more the likelihood of good ones.

4. Combinations and improvement are sought. In addition to contributing ideas of their own panel members should indicate how suggestions by others could be turned into better ideas, or how two or more ideas could be combined into a still better idea.[3]

The suggested group size was fifteen people. A chairman is appointed to keep the session moving and ideas are produced one after the other with no evaluation during a given time limit. Ideas are written down

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[1]Osborn, op. cit., p. 213.

[2]Parnes, op. cit., p. 154.

[3]Ibid.

by a secretary. The technique is very effective for individual use. John Arnold summarizes it in this way:

> I am convinced that it is possible, for I can do it and I know many others who also can do it, that an individual can form a brainstorming group with himself as the only member. In this case, the elimination of the internal as well as external standards of judgment and evaluation and the proper use of checklists, area thinking or attribute listing, or what have you, can result in a great many ideas and alternatives that can, at a later time, be evaluated as possible solutions for some problem that is facing you. [1]

An eighth technique is based on the idea of chain reaction thinking and is called Associationism. Osborn said that:

> This phenomenon gears imagination to memory and causes one thought to lead to another. Its powers have been recognized for over 2,000 years. Plato and Aristotle stressed it as a cardinal principle of human psychology. [2]

A ninth technique is to keep a notebook in which to write down ideas as they occur to the individual. Robert Tiernan suggests this as a very important aid in idea development. He said that we forget many good ideas that occur to us that might be useful, because we do not write them down and we promptly put them out of mind. Often these ideas never come back. Even if the idea itself did not prove to be what was wanted it might have lead to a really productive idea. Tiernan suggests that one carry a notebook at all times in order to list

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[1] Osborn, op. cit., p. 142.

[2] Ibid., p. 112.

ideas as they occur.

A tenth technique is to keep an Idea Bank. The idea bank is a manila envelope, a box, etc., in which is kept anything which might spur an idea. Tiernan suggested that the bank be started with one interest in mind, for example, a hobby. The bank serves as a personal source file filled with newspaper clippings, photographs, original observations, etc. Things that go into the bank need only be meaningful to the person keeping it and should be added to continually. The idea of an idea bank or source book is also advocated by advertising executive, James Webb Young.[1]

These are just a few of the techniques which can be used to increase idea production to result in more unique solutions and products. Greater attention should be given to teaching these techniques in the public schools.

III. ADOLESCENT ART EDUCATION LITERATURE

A search of the recent literature pertaining to art education of junior high school adolescents revealed agreement among prominent art educators concerning the unique nature of art education at this level. There was significant agreement that the junior high school art program

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[1]James Webb Young, A Technique for Producing Ideas (Chicago: Advertising Publications, Inc., 1963), p. 40.

needed to be formulated with a thorough understanding of the development of the total individual at this age. Dr. John A. Michael, in his introduction to Art Education in the Junior High School, which he edited in 1964, outlines the following areas of consideration in a junior high school art program: intellectual growth, emotional growth, social growth, perceptual growth, physical growth, aesthetic growth, and creative growth.[1] Planning a program with all these factors in mind requires not only a special kind of curriculum, but also a special kind of teacher and a sympathetic administration.

Characteristics of the age level. Junior high school students are involved in the struggle between dependence and independence. They are just emerging from childhood. Each child is struggling with the changes within himself in his own unique way. One of the special aspects of this period of development is the necessity of recognizing the unevenness of growth which is taking place. One minute the student may act very mature and the next minute will appear to have regressed to his early childhood. Because the student is growing so rapidly, he is often in a state of "crisis." What appear to be very small problems in the eyes of the adult, are actually almost overwhelming obstacles to the young adolescent. Whitson has said:

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[1]John A. Michael (ed.), Art Education in the Junior High School (Washington, D. C.: National Art Education Association, 1964), pp. 11-12.

> This emergence from childhood can be called a critical crisis in the world of the adolescent not only because of the physical aspects which occur during this period, but also by a sudden awareness of pressing social responsibilities with which the young adult is expected to cope.[1]

The student, himself, is often surprised and dismayed to find himself in tears over the smallest of upsets. Large spurts of enthusiasm and energetic work may be followed by periods of lethargy and genuine fatigue. A student who appears to be tired and disinterested may merely be going through a particularly difficult stage of physical growth and may be using all his energy in the growing process. Adults dealing with the early adolescent must be constantly aware of the effects of unevenness in physical development on the reactions of individual students. They need to be aware also of the problems students may have in muscular coordination. Charles and Margaret Gaitskell point out the need to recognize clumsiness as a result of ". . .retardation of certain types of co-ordination and agility because of physiological growth."[2] They cited the need for adequate space in the art room and for a suitable arrangement of furniture and equipment. They stated further that:

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[1]Alexander Whitson, "A Case for Individual Latitude," School Arts, LXIII (May, 1964), 36.

[2]Charles D. Gaitskell and Margaret R. Gaitskell, Art Education During Adolescence (New York: Harcourt, Brace and Company, 1954) p. 2.

> It is obvious not only that a pupil's inability to meet motor requirements successfully affects his art production directly, but also that because of embarrassment resulting from his clumsiness his output may be adversely affected from an emotional standpoint.[1]

Carl Reed has said:

> Successful teaching demands an awareness of what is happening in the maturation process. The young adolescent with his particular drives, fears, frustrations, interests, and prejudices presents a very real challenge. This challenge can be met only by an understanding, benign interest in the adolescent.[2]

This interest in the adolescent must stem from a genuine desire to aid the individual in his search for self-identity. Each student is seeking to discover who he is and what he wishes to find in life. A great deal of time in early adolescence is spent in daydreaming and quiet contemplation of what is thought about every aspect of life. Daniel Mendelowitz cited the opinions of Eric H. Erickson:

> One of the outstanding contemporary analysts of youth, Eric H. Erickson, makes a brilliant summary of the crux of the problem of adolescence in his book Childhood and Society, when he says: "What the regressing and growing, rebelling and maturing youth are now primarily concerned with is who and what they are in the eyes of a wider circle of significant people as compared with what they themselves have come to feel they are; and how to connect the dreams, idiosyncrasies, roles and skills cultivated earlier with the occupational and sexual prototypes of the day."[3]

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[1] Ibid.

[2] Carl Reed, Early Adolescent Art Education (Peoria, Illinois: Chas. A. Bennett Co., Inc., 1957), p. 38.

[3] Daniel M. Mendelowitz, Children Are Artists (Stanford, California: Stanford University Press, 1963), p. 95.

The student is struggling between two influences (1) his desire to be liked and admired and accepted by his peers, and (2) his desire to find himself. Whitson has said, "He is searching for identity--his identity from the masses."[1] The junior high school art program can make a unique contribution in aiding the student in his struggle to find himself.

Philosophy and needs of the seventh grade art program. The first consideration in planning an art program for adolescents in seventh grade is their needs. The art program, to be effective, must relate to the interests of the students. John A. Michael emphasizes this need saying:

> Here, art can help to provide an answering challenge toward adventure, as well as a sense of personal achievement and of group belongingness, which may be sought in destructive ways if we do not first help these young adolescents to find such satisfactions in better ways. What results from their art experiences depends on understanding, patience, a sympathetic climate, sensitive guidance and a broad and flexible program to meet all types of needs.[2]

And the Report of the Commission on Art Education in 1965 said:

> The scope of the junior high school student's interests is broad--from snakes to satellites. He is capable of pursuing an interest in depth; in fact, such interests, frequently unrelated to art expression, consume his time. He challenges the art teacher to gain and hold his interest. Yet, because the age is one of unjelled interests and ideals, of physical and mental growth, it holds great opportunity for the art teacher.[3]

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[1]Whitson, loc. cit.

[2]Michael, op. cit., p. 19.

[3]Mary Adeline McKibbin, "Art in the Secondary Schools," Report of the Commission on Art Education, Jerome Hausman (ed.) (Washington, D.C.: National Art Education Association, 1965), p. 86.

One of the goals of the program should be an exploration of what comprises the art field. Special consideration should be given to art in everyday life. Art in seventh grade is usually required for all students and may be the last contact with a formal art program that the student will receive. The terminal nature of the program for many, makes it necessary to include an exploration not only of art materials and methods, but also of the components of the students visual environment. The visual environment of the student would include an awareness of the physical plan of the community, its architecture and the home environment of the student.

Reed points out that, "The art attitude which the student will carry through life will be materially affected, if not completely formulated during these junior high years."[1] Art teachers need to be aware of the apparent decline in creative confidence and ability which effects the student's attitude toward art. Helen Merritt said:

> But despite opportunity, stimulation, and encouragement, far too many children seem less creative in the sixth grade than they were in the second. Too many children enter adolescence doubtful of their creative ability and discouraged with their art products.[2]

Keiler points out the necessity of, ". . .distinguishing between the range of their imagination and their ability and willingness to transfer

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[1]Reed, op. cit., p. 17.

[2]Helen Merritt, Guiding Free Expression in Children's Art (New York: Holt, Rinehart and Winston, 1964), p. 11.

it into visual expression."[1] Keiler also brings out the fact that the student is reluctant to do things which may not result in success.[2] The student is concerned not only with his own dissatisfaction with results of his efforts, but also with the reactions of his peers. Even when the student has created a successful piece of work he needs reassurance that it is worthy of praise. This praise needs to come from his peers as well as adults. This is perhaps why proper display of art work is so important. Hall displays as well as displays of work in the classroom give the student a much needed boost in confidence.

This needed building of confidence should be supported by a suitable curriculum. What kind of a curriculum should be planned for this transitional age group? According to a 1967 position paper published by the National Art Education Association, the four purposes of art in the junior high school are contained in the following experiences:

> . . . seeing and feeling visual relationships, the making of art, the study of works of art from the past and present, and the critical evaluation of art products.[3]

John Michael said:

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[1]Manfred Keiler, The Art in Teaching Art (Lincoln: University of Nebraska Press, 1961), p. 26.

[2]Ibid., p. 74.

[3]"The Essentials of a Quality School Art Program," a position statement by the National Art Education Association, 1967.

> The art program will be broad in its scope to meet the needs and interests of junior high school students. The creative teacher will make room for individuality, valuing and encouraging differences. This respect for differences allows students to grow into their respective unique selves and at their own rate. A variety of materials will challenge these unique selves and encourage originality.[1]

In addition the National Art Education Association Position Paper cited above stated:

> While the middle or junior high school art program should be exploratory in nature and broad in concepts and experiences, it should also offer opportunity to acquire basic skills.[2]

These skills would include, "The honest and effective use of tools. . ."[3] Junior high school students are especially interested in learning to use tools and materials and equipment with which they are unfamiliar. Yet as Leon Frankston points out, "It is the new concept toward materials that is important--the ability to use them in different contexts and in personal ways."[4] Carl Reed discusses the "wholeality" of the curriculum when he stated:

> A student engaged in the creative process is working at the highest possible level--intellectually, emotionally, and physically. All pertinent knowledge, experience, and skills have to

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[1]Michael, op. cit., p. 59.

[2]Position statement, op. cit.

[3]McKibbin, op. cit., p. 87.

[4]Leon Frankston, "Effects of Two Programs and Two Methods of Teaching Upon the Quality of Art Products of Adolescents," Studies in Art Education, VII (Spring, 1966), 9.

> be selected and organized by the creator and funneled into the activity of creation. The emotions have to be brought into play before and during the creative process. A complete coordination of the technical skills and physical abilities of the creator is demanded. This process of the integration of the student's abilities is a valid justification for art in the pattern of secondary education.[1]

Assignments should be given to challenge the student. Experimentation for its sake alone is not valid, according to present art education philosophy. Keiler said,

> Experimentation will be effective only if the junior high school student is confronted with a problem for which he has no satisfactory solution, and he is reassured by the teacher that one can be found through this experience.[2]

The program must have direction. Robert C. Burkhart said:

> Learning in art really is basically a relative evaluative activity. That is, creative learning is essentially learning through action, which means that progress can occur only when action has a constructive direction.[3]

In regard to this reference to evaluation, it should be mentioned that current art education philosophy advocates evaluation as a continuous process carried on by both the student and the teacher. This process of evaluation includes student self-evaluations; a folder for art work produced during a semester; group evaluation sessions for various units

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[1]Reed, op. cit., p. 61.

[2]Keiler, op. cit., p. 74.

[3]Robert C. Burkhart, Spontaneous and Deliberate Ways of Learning (Scranton, Pennsylvania: International Textbook Company, 1962), p. 7.

and teacher evaluations.

The teacher for the junior high school art class must have the necessary confidence and sensitivity to allow the students freedom to be themselves through their work and in their classroom performance. The teacher needs to possess a keen sense of humor which gently smooths over the awkwardness of junior high "growing pains." Gary Barlow discussing the junior high school art teacher listed eleven major qualifications needed by an art teacher at this level:

A. Creativeness as an individual
B. Knowledge and understanding of junior high pupils
C. Empathy for junior high school pupils
D. Enthusiasm and dedication
E. Maturity with a sense of humor
F. Permissive atmosphere in the classroom
G. Good organization and classroom management
H. Understanding the fields of art, art education, and education
I. Professional orientation
J. Good health and appearance[1]

In addition to the above, Reed feels the teacher, ". . . must always be ready to guide when necessary, encourage when advisable and teach when required."[2] He also added that the teacher needs to challenge the student, "In general, we do not really challenge our youth enough to bring forth the quality of work of which they are capable."[3] Vigilant

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[1]Michael, op. cit., pp. 107-112.

[2]Reed, op. cit., pp. 67-68.

[3]Ibid., p. 58.

attention should be paid to the quality of work the students are producing.

Motivation of students at the junior high school level is more complex than it was in the elementary school art program. Junior high school students tend to be extremely enthusiastic one minute and listless the next. Reed points out that the students "hesitate" but do not really "lose" interest.[1] Activities should be planned with the students interests in mind. Students should be given the opportunity to help plan some of their activities. At this age students respond to trust which the teacher places in them while making them a part of a learning "team" and this confidence the teacher places in them also serves as a motivational factor. The teacher should express sincere praise for any job well done in the classroom. Attention should also be given to athletic, scholastic, etc., accomplishments outside the classroom, so that the student feels accepted as an individual. If the student feels accepted and liked, he is more apt to perform effectively in art.

IV. LIMITATIONS OF PREVIOUS STUDIES

The review of related literature was concerned with the research, opinions and recommendations of psychologists, scholars and art educators in the areas of creativity, problem solving and adolescent art education.

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[1]Ibid., p. 42.

Creativity literature revealed that until about 1950 most investigation was centered on the creative product.rather than on the creative process. The creative process has been considered difficult to assess. There are some intuitive and evasive jumps in the thinking patterns involved in the creative process. These jumps are hard to analyze and measure. Although recent research has been more actively interested in investigating the creative process, a major portion of research in this area remains to be done.

Problem solving literature has been primarily concerned with college students and adults in business and industry. The review of literature revealed a need for more research pertaining to children through high school age. Our educational system needs to pay more attention to the development of student ability to think for themselves. More opportunities need to be provided in the school curriculum for using thinking abilities to solve a variety of "open ended" problems to which there is no specific answer.

Most of the literature relating to adolescent art education was general in nature. There is a need for more up-to-date publications like Art Education in the Junior High School and the 1967 Position Statement concerning essentials of a school art program by the National Art Education Association.

In all three areas of the literature a comparatively small amount of literature related specifically to the junior high school. Much more research needs to be done in regard to the unique needs of the transitional junior high school level.

CHAPTER III

RESEARCH METHODS

I. DESCRIPTION OF RESEARCH METHODS

Procedures for the research for this study included four methods of data collection. The data collection instruments were: a pre-questionnaire; a post-questionnaire; two forms of The Torrance Tests of Creative Thinking, used as pre- and post measures; counting of Thumbnail sketches; and a Gestalt Panel of Art Experts. This chapter briefly describes the conditions under which the research was conducted, the groups used in the study and the methods of data collection.

Subjects. Subjects for the study were members of four classes of seventh grade art taught by the investigator. There were either fifteen or sixteen students in each class. The total number of research subjects was sixty-two. The students were members of intact classes selected by computer assignment as described in chapter one.

Teacher. The investigator was the teacher for all of the classes in the study. She had had six years experience teaching junior high school art and had completed all course work for her master's degree.

Environment of the school. The population of Central Junior High School in Ames, Iowa used in the study is not to be considered average

or typical of all junior high schools. The location of the school in a university community resulted in the composition of the population having a large number of university related students. The average IQ of the members of the school is considered to be above average.

Length of time for the study. The study lasted for eight and one-half weeks. The makeup of the school week was such that each student received "two and a half" days of art per week. The basis of this was giving each group art only on alternating Fridays. The students in the Monday, Wednesday, Friday classes had art Monday, Wednesday and every other Friday. The Tuesday, Thursday, Friday classes had art on the alternating Friday.

II. GROUPS USED

Similarities in the testing groups. Four groups of subjects were used. Two of the groups served as control groups and were called Technique groups. Two of the groups served as experimental groups and were called Problem Solving groups. Each group contained either fifteen or sixteen subjects. All of the subjects were seventh grade students in the same junior high school in art classes taught by the investigator. The students were from eleven to thirteen years old. The groups were taught in the same classroom. The subjects were allowed freedom to move about the classroom to get supplies as needed. Each of the four

classes had assigned monitors to pass out folders and basic materials and equipment at the beginning of each class period. All subjects were given the pre- and post standardized tests and the questionnaires devised by the researcher, under the same conditions.

Differences in the testing groups. The technique groups were given no instruction in problem solving techniques. They were treated differently when assignments were given because there was no group questioning period, as part of the motivation. At the beginning of the testing period, while the problem solving groups were given special instruction in problem solving techniques, etc., the technique groups were given additional pen and ink drawing assignments.

The problem solving groups were given several class periods of discussion about the creative process and problem solving technique investigation and practice. The subjects were given special problem solving "help" sheets. These sheets may be found in Appendix E. One sheet called, "Some Questions to Ask Yourself When Solving an Art Problem" was devised by the researcher. Another sheet developed by Alex Osborn, Founder of the Creative Education Foundation, called "Idea Spurring Questions" was also used. A special emphasis was placed on the helpfulness of student idea books and idea banks. Practice in group and individual brainstorming was given. Students were encouraged to use a questioning attitude.

The individual style of the artist was discussed in all four groups as it related to art history and to the development of the students own individual styles. In the problem solving groups there was additional discussion of style as it related to the creative process.

III. TEST MATERIALS AND METHODS USED

Torrance Tests of Creative Thinking. For the purposes of this study, the Torrance Tests of Creative Thinking were chosen for a standardized measure of growth in fluency during the testing period. Before selection of the tests, the investigator wrote to both Dr. E. Paul Torrance, originator of The Torrance Tests of Creative Thinking and to Dr. J. P. Guilford, developer of another battery of creativity tests. Dr. Torrance replied with reference to the Personnel Press, Inc., publishers of his tests in the research edition, with whom the researcher corresponded further (see Appendix J). Dr. Guilford wrote with some suggestions for what to look for in the testing and sent some booklets about his research projects with the Aptitudes Research Project at the University of Southern California (see Appendix J). After considering the tests of both Torrance and Guilford, the researcher chose the Torrance Tests as measures, because of their widespread use with school children as well as with groups of people through graduate school.

All students in the study were given the Torrance Tests of

Creative Thinking, Figural A, at the beginning of the testing period. The post test, The Torrance Tests of Creative Thinking, Figural B, was given to all subjects at the end of the eight and one-half week testing period, in the same manner. The Torrance Tests of Creative Thinking, pre- and post tests were administered to each group during regular fifty-five minute class periods. Actual testing time was thirty minutes. The Torrance Tests had three activities, each of which required ten minutes to complete. Time was allowed between activities for reading of directions for the next activity. A t Test and a Pearson Product Moment Correlation were run only on this particular data collection method. This data was left out because it seemed to be invalid. (See conclusions.)

Thumbnail sketches. Each student made idea or thumbnail sketches before three of the assignments: texture reliefs, posters and masks. The mask unit was begun near the end of the research testing period. The investigator counted the sketches for quantity. (Comments were made by the investigator regarding quality.) The totals of the thumbnail sketches were compared through the use of tables to see what happened during the different stages of the experimental program. The null hypothesis was that no difference would appear between the groups. The investigator looked for an hypothesized increase in idea output.

Pre-questionnaire. A pre-questionnaire devised by the investigator was given to all subjects in the study. The pre-questionnaire was given at the beginning of the period following the Torrance Test of Creative Thinking, pre-test. The groups were all treated in the same manner. All students were told that the researcher wanted to get to know them better so that she could be of more help to them in helping them grow in art. The purpose of the questionnaire was to determine what kinds of attitudes were held by the students toward creative problem solving and creative activity. The researcher also wanted to determine what kind of background the students had had in techniques of problem solving. The analysis of the questionnaire was done both with tables and in narrative form.

Post questionnaire. A post questionnaire devised by the investigator was given to all the subjects as a follow-up of the investigation of attitudes of subjects toward problem solving. It was given to the students after they completed the Torrance Tests of Creative Thinking, Figural B, post test. The questionnaire was analyzed by the investigator in a narrative manner with the aid of Table XIV. This questionnaire was compared with the pre-questionnaire in the cross reference of results in Chapter Four.

Panel of art experts. Four art experts were selected to rate the

products of the technique and problem solving groups. Judges were: Wayne Lohr, Instructor in Art Education, Drake University; Janice Anderson, Design Instructor, Iowa State University; Naomi Cook, Art Teacher, Junior and Senior High School, Nevada, Iowa; and Darlene Frazier, Art Instructor at Boone Junior College, formerly a junior high school art teacher. They met Sunday afternoon, April 26, 1968 in the investigator's classroom.

A twenty minute judge's training session was held first. It began with a review of the purposes of the study. The judges were then instructed in the procedures of judging the products of the study. Each judge was given a folder which contained the sheet which explained the criterion for judging; the rating scale, and the rating sheets (see Appendix E). The criterion sheet was discussed and clarifications were made as needed. The rating scale was explained. The method of using the rating sheets was demonstrated and the judges were told how the products were coded. The importance of independence in judging was stressed. Each judge had a total of sixteen rating sheets. Each of the four products to be rated were divided into four groups and coded as group one, two, three, or four. Only the researcher knew which of the groups were the technique groups and problem solving groups. The pieces of art work within each group were individually coded with the students code number. As can be noted on the sample in Appendix E, the rating sheet

was constructed so that it was used folded in half. Each piece of work was rated for creative imagination and aesthetic quality. There was no discussion among the judges once the judging began because an independent rating environment was desired. Scores of the judges were totaled separately and evaluated to see similarities and differences in the amount of agreement between the judges. Conclusions were drawn by the investigator as to what the evidence indicated.

CHAPTER IV

RESULTS OF THE INDIVIDUAL EXPERIMENTS

The results of the four methods of data collection used in this study will be discussed in this chapter. The measures were: The Torrance Tests of Creative Thinking; A Tabulation of Thumbnail Sketches; Pre- and Post Questionnaires; and a Panel of Art Experts to rate art products done during the testing period.

I. THE TORRANCE TESTS OF CREATIVE THINKING

Two forms of the Torrance Tests of Creative Thinking were used in the testing program. Figural A, "Thinking Creatively with Pictures," was used for the pre-test. Figural B, "Thinking Creatively with Pictures," was used for the post test. The researcher felt that Activity Three, which differed in the two forms was not sufficiently comparable to measure accurately the information sought. This observation may give some clues as to the failure of the tests to present expected gains. Figural A, presented thirty sets of parallel lines to be used as the main part of an idea or picture while Figural B used thirty-six circles. Scoring for the purposes of this study was the counting of ideas to achieve raw score totals. There was scoring difficulty due to the widespread tendency of the students in all groups to combine circles in Figural B, to create one thing, while in the parallel lines task in Figural A most students stayed

with one set of lines for each idea completed.

The fluency scores represented in Tables I, II, III, and IV were based on the combined scores for fluency for Activities Two and Three. Fluency refers to the total number of different ideas produced in a ten minute period for each task.

Table I below compares the mean scores for the pre- and post tests.

TABLE I

TORRANCE TESTS OF CREATIVE THINKING PRE- AND POST TEST MEAN SCORE COMPARISON, SEVENTH GRADE ART SPRING, 1968

	Group	Pre-Test February, 1968	Post Test April, 1968
Technique	Group One	17.62	23.68
	Group Two	27.80	26.06
Problem Solving	Group Three	19.60	20.80
	Group Four	15.81	18.93

Technique Group One advanced 6.06 points and Technique Group Two regressed 1.74 points. Problem solving Group Three advanced 1.20 points and Problem solving Group Four advanced 3.12 points. Three of

the four groups showed some growth. The pre-test score for Technique Group Two was approximately ten points higher than any of the other groups. The researcher knew of no factor to account for such a discrepancy. The growth of groups one, three and four could have occurred due to a number of factors, one of which was the familiarity of the students with the test format in the post test. The researcher feels that it is necessary to point out that an analysis of quality of responses compared to quantity of responses might reveal responses of a higher quality in the problem solving groups.

Table II, page 66; Table III, page 67; Table IV, page 68; and Table V, page 69; show the scores for each student in each group for the pre- and post tests. In Table II, seven students had scores at, or above, the mean score on the pre-test, but ten at, or above, the mean score for the post test. In Table III, the mean score dropped but the number of students at, or above, the mean score remained nine. In Table IV, eight students had scores at, or above, the mean for the pre-test and nine students had scores at, or above, the mean on the post test. In Table V nine students were at, or above, the mean score on both pre- and post tests. As can be noted on all four tables some students remained at the same level while others like student number five advanced thirteen points from pre- to post test. Other students like number twenty-nine who decreased six points, regressed. No pattern

TABLE II

TORRANCE TESTS OF CREATIVE THINKING FLUENCY SCORES
SEVENTH GRADE ART, TECHNIQUE GROUP ONE
AMES, IOWA SPRING, 1968

Student Code Number	Pre-Test	Post Test
47	15	29
48	12	14
49	15	10
50	15	24
51	17	23
52	19	12
53	32	30
54	20	34
55	15	23
56	20	31
57	14	21
58	17	25
59	12	25
60	15	24
51	27	36
62	17	18
Mean Scores:	17.62	23.68

Number of subjects: 16

TABLE III

TORRANCE TESTS OF CREATIVE THINKING FLUENCY SCORES
SEVENTH GRADE ART, TECHNIQUE GROUP TWO
AMES, IOWA SPRING, 1968

Student Code Number	Pre-Test	Post Test
32	38	28
33	33	29
34	36	29
35	14	17
36	36	18
37	31	33
38	21	23
39	19	19
40	40	35
41	23	22
42	18	26
43	28	28
44	18	34
45	34	22
46	28	28
Mean Scores:	27.80	26.06

Number of Subjects: 15

TABLE IV

TORRANCE TESTS OF CREATIVE THINKING FLUENCY SCORES
SEVENTH GRADE ART, PROBLEM SOLVING GROUP THREE
AMES, IOWA SPRING, 1968

Student Code Number	Pre-Test	Post Test
17	22	9
18	12	13
19	13	30
20	22	26
21	7	7
22	18	16
23	24	27
24	20	29
25	25	22
26	11	21
27	18	19
28	18	27
29	28	22
30	33	27
31	23	17
Mean Scores:	19.60	20.80

Number of subjects: 15

TABLE V

TORRANCE TESTS OF CREATIVE THINKING FLUENCY SCORES
SEVENTH GRADE ART, PROBLEM SOLVING GROUP FOUR
AMES, IOWA SPRING, 1968

Student Code Number	Pre-Test	Post Test
1	12	11
2	27	22
3	20	25
4	17	19
5	14	27
6	18	16
7	10	21
8	21	27
9	14	13
10	17	20
11	18	16
12	9	13
13	12	14
14	16	26
15	15	18
16	13	15
Mean Scores:	15.81	18.93

Number of subjects: 16

of scores developed in the groups.

II. THUMBNAIL SKETCHES

Thumbnail sketches were counted and analyzed by the researcher. The researcher was attempting to find out how many sketches the students made before beginning a given project and to see if the problem solving training had a noticeable effect on the number of sketches made by the subjects. A random selection of thumbnail sketches was made and the examples photographed to give the reader a frame of reference to what was being discussed. The penny in these photographs was used to establish size relationships. Examples of thumbnail sketches for the texture relief project are given in Figures one, two, and three. In Figure one, the student has made four drawings. She selected the example in the upper right corner to execute. (It can be seen in its completed state in Appendix I, Figure 16.) Figure 2 shows the work of another student who had six thumbnail sketches. He selected the example with the red markings on it. Figure 3 was selected because it shows the sketches of a student who is highly fluent, with ten sketches done during the same time period in which the previous mentioned students did less sketches. Figures 4 and 5 were thumbnail sketches for the poster unit. The students were basing their posters on something which was of interest to them. Figure 6 is an example of a highly fluent student and

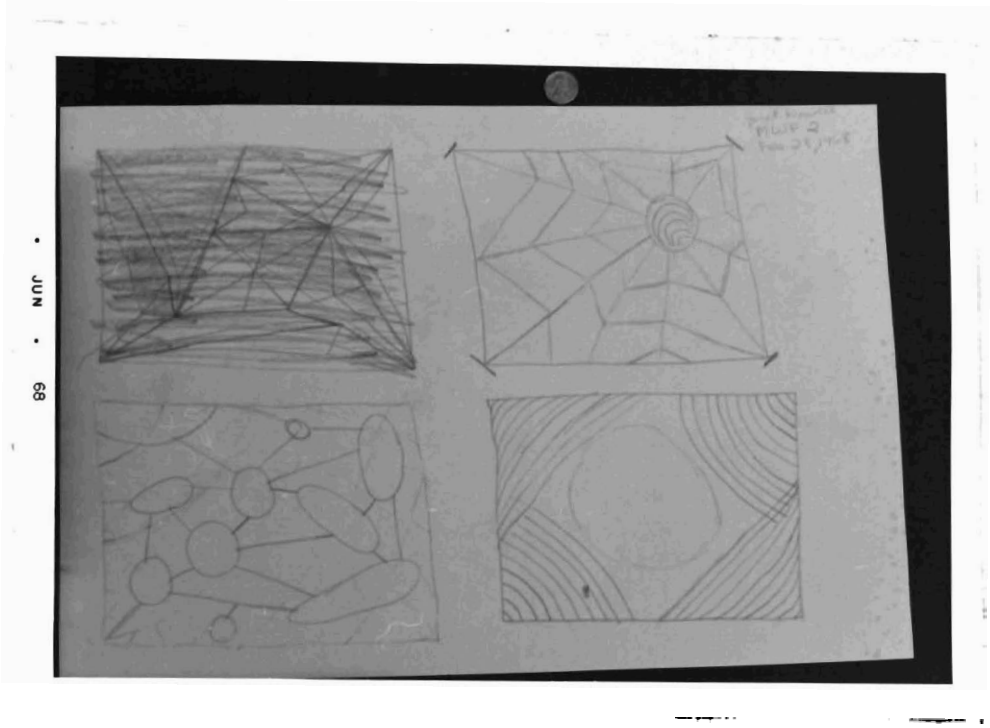

Figure 1. Example of a Thumbnail Sketch for a Texture Relief.

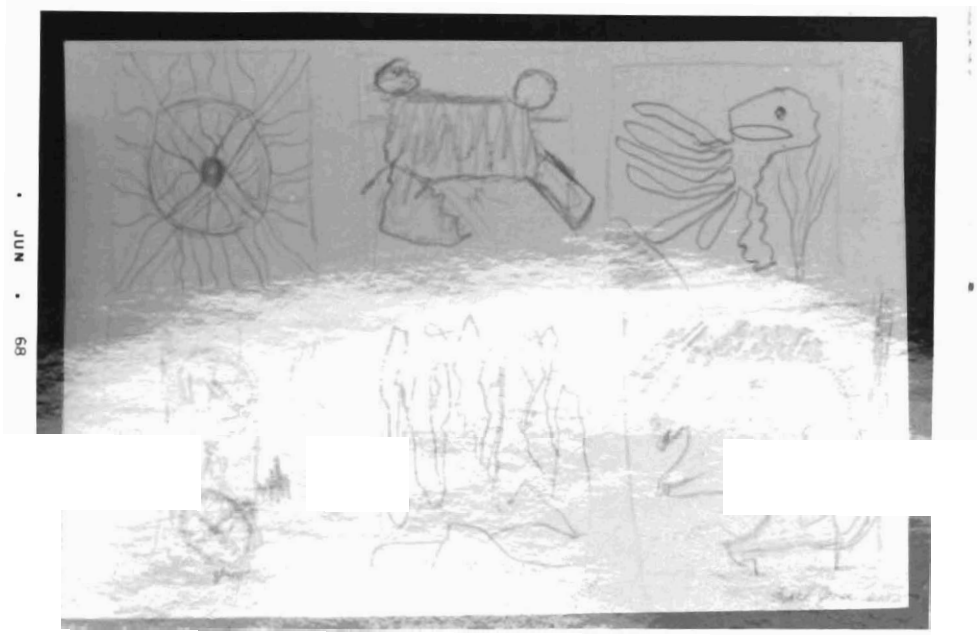

Figure 2. Example of a Thumbnail Sketch for a Texture Relief.

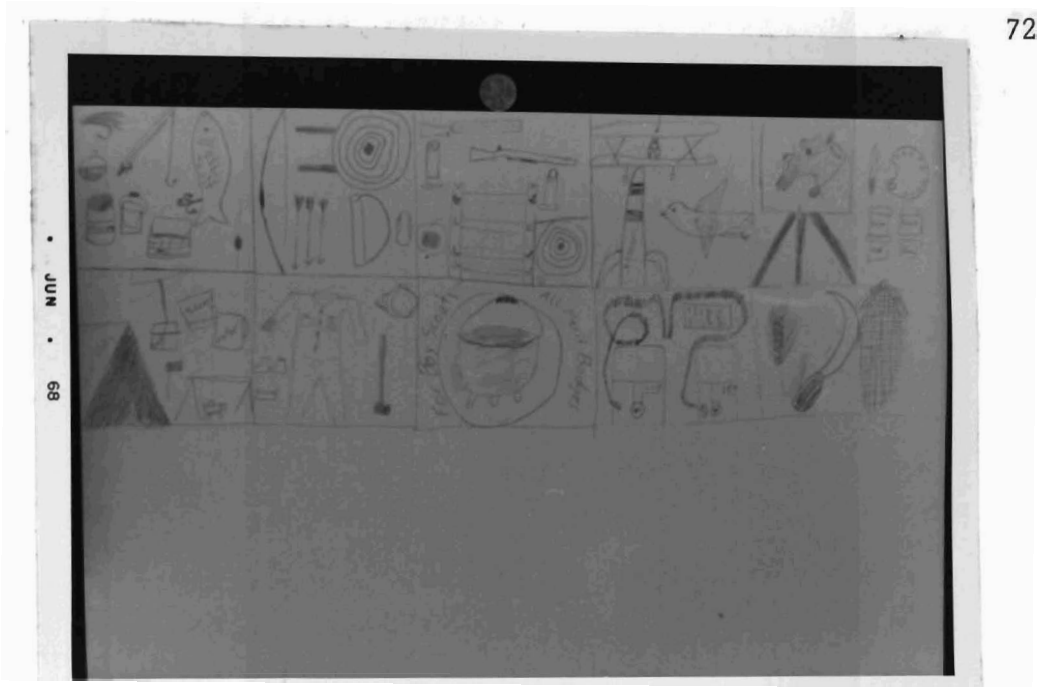

Figure 3. Example of a Thumbnail Sketch for a Texture Relief.

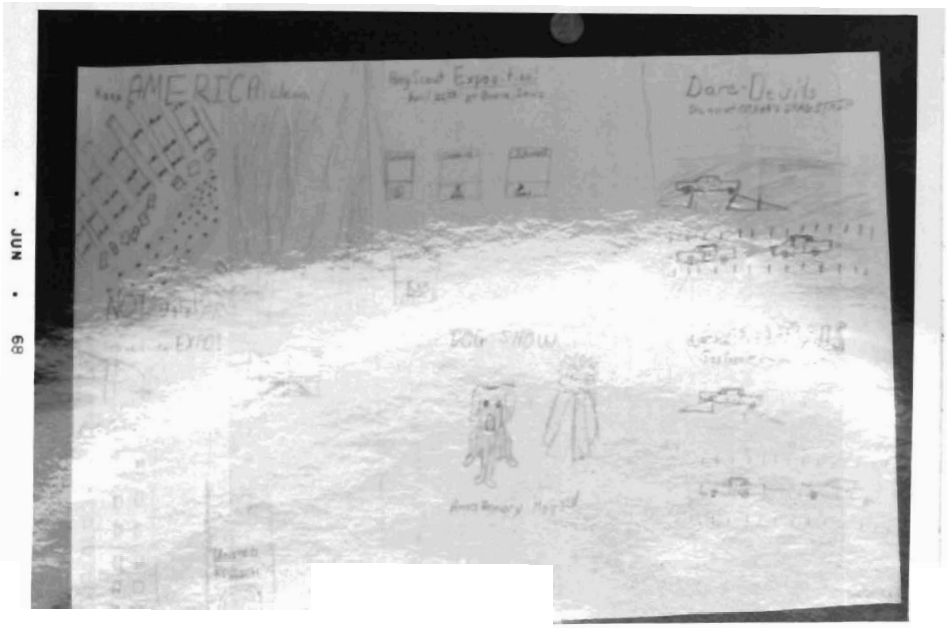

Figure 4. Example of a Thumbnail Sketch for a Poster.

Figure 5. Example of a Thumbnail Sketch for a Poster.

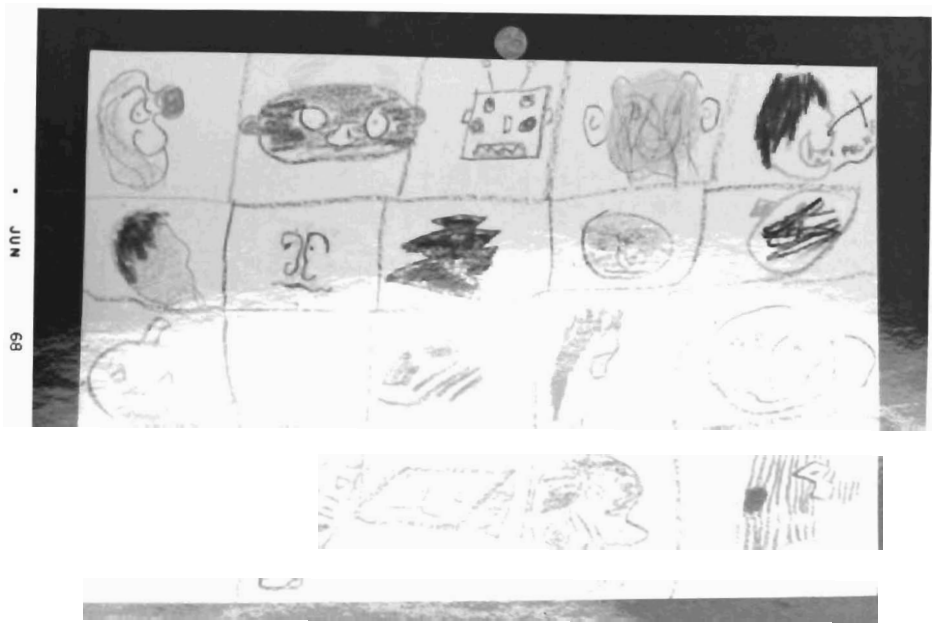

Figure 6. Example of a Thumbnail Sketch for a Mask.

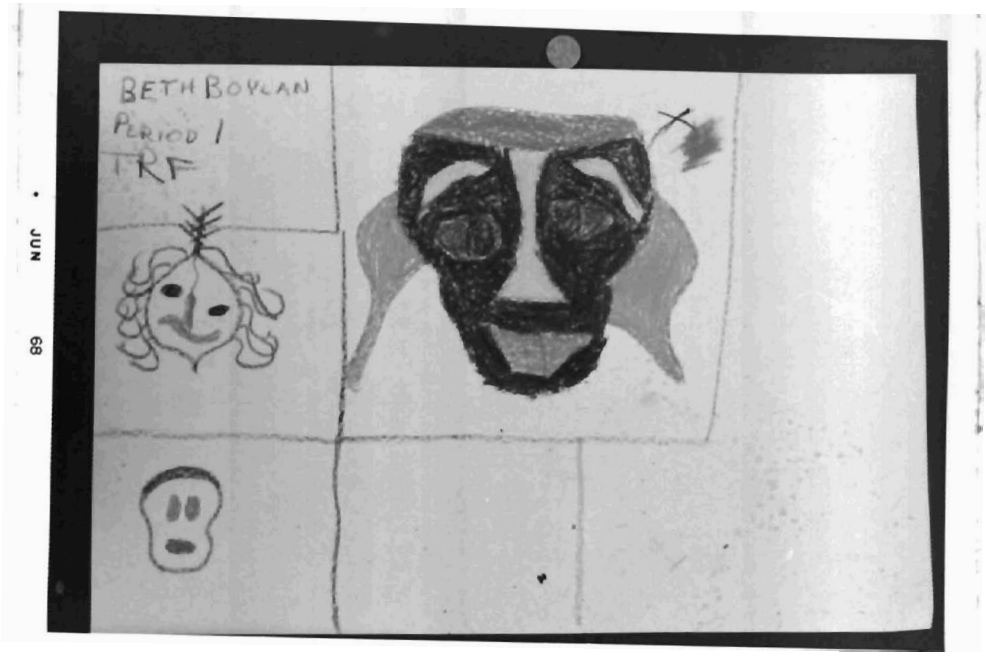

Figure 7. Example of a Thumbnail Sketch for a Mask.

Figure 8. Example of a Thumbnail Sketch for a Mask.

it brings out the fact that students who work very quickly do very sketchy and incomplete drawing, but drawings which appear to give them inspiration for the next drawing. Other students who arrive at an idea fairly soon spend more time on one of their few drawings and devote more effort to adding details to it. In Figure 8 the mask drawings correlate highly with the resulting mask. All of this student's drawings look very much like the finished mask. It appears that the student had one particular image in mind which he was able to produce in the finished mask.

Tables VI, VII, VIII, IX show the number of thumbnail sketches for each of the sixty-two subjects used in the study. Table VI, page 76, for Technique Group One shows a gain of twenty-nine sketches when the posters were designed and twenty additional sketches for the total group when designing for the masks. The students in this group have appeared to become more fluent as the semester progressed.

Table VII, page 77, for Technique Group Two shows a decline in the number of sketches produced throughout the study. There were seventy-two sketches for the texture reliefs, the highest total for all four groups, but only forty-nine sketches for the posters, a decline of twenty-three sketches. The gain between the poster and the mask project was only four points.

In analyzing Tables VIII and IX showing tabulation of sketches of both problem solving groups, it should be noted that both groups

TABLE VI

TABULATION OF THUMBNAIL SKETCHES
TECHNIQUE GROUP ONE
SEVENTH GRADE ART
SPRING, 1968

Student Code Number	Texture Reliefs	Posters	Masks
47	2	5	10
48	1	4	2
49	1	1	2
50	2	8	4
51	3	1	7
52	3	4	5
53	3	4	7
54	1	6	20
55	3	1	5
56	5	3	2
57	2	4	6
58	1	1	5
59	1	7	8
60	3	4	3
61	1	4	4
62	2	6	2
Totals:	34	63	89

TABLE VII

TABULATION OF THUMBNAIL SKETCHES
TECHNIQUE GROUP TWO
SEVENTH GRADE ART
SPRING, 1968

Student Code Number	Texture Reliefs	Posters	Masks
32	6	1	3
33	3	2	4
34	8	3	4
35	4	2	4
36	7	1	9
37	4	8	2
38	6	4	4
39	4	4	4
40	6	2	2
41	4	2	2
42	4	3	3
43	3	2	2
44	2	2	2
45	6	2	2
46	5	6	6
Totals:	72	49	53

TABLE VIII

TABULATION OF THUMBNAIL SKETCHES
PROBLEM SOLVING GROUP THREE
SEVENTH GRADE ART
SPRING, 1968

Student Code Number	Texture Reliefs	Posters	Masks
17	2	4	4
18	1	3	3
19	3	1	2
20	1	2	4
21	1	3	1
22	2	3	2
23	3	1	2
24	1	1	3
25	3	4	2
26	1	1	8
27	4	2	4
28	3	3	4
29	6	5	5
30	1	1	2
31	3	2	2
Totals:	32	34	48

TABLE IX

TABULATION OF THUMBNAIL SKETCHES
PROBLEM SOLVING GROUP FOUR
SEVENTH GRADE ART
SPRING, 1968

Student Code Number	Texture Reliefs	Posters	Masks
1	7	6	5
2	10	3	6
3	8	6	4
4	2	8	6
5	2	4	4
6	3	3	8
7	1	6	6
8	5	4	5
9	3	3	7
10	1	3	5
11	3	1	5
12	1	2	5
13	1	2	3
14	2	7	11
15	2	1	4
16	1	2	8
Totals:	52	61	92

made progress during the testing program from project to project. The highest amount of growth in both groups was between the second and third projects. Progress was made in the fluency of these groups.

An overall evaluation of the tabulation of thumbnail sketches shows that there was progress in three out of the four groups in the number of ideas produced during the testing period.

III. RESULTS OF THE PRE-QUESTIONNAIRE

The pre-questionnaire was administered to give an indication of how the subjects in both technique and problem solving groups felt toward problem solving and creativity at the beginning of the study. The results were tabulated by groups. Similarities in attitude appeared to exist among most of the subjects at the time the pre-questionnaire was given. Tables X, XI, XII, and XIII show all of the responses on the questionnaire which could be tabulated numerically. Pertinent information from the narrative response questions will be indicated when significant.

In response to the first question, What is a problem?, typical replies from the total population were:

"A problem is something that is hard to solve and it usually makes you worry."

"Something that present difficulty."

"Something that you do not understand."

Students associated problems with worry and difficulty. Their definitions of problems indicated that the adolescent period of growth was already presenting many sources of worry for them.

In response to the second question, Do you ever wish you knew how to solve problems more effectively?, in all groups the majority of the students answered yes. This indicated a need for teaching students ways of dealing with problems.

Question three, What do you think it means to be a creative person?, resulted in the following kinds of answers from the students;

> "A person who can think up ideas that no one has thought of in his day and age."
>
> "You're able to think up new ideas of your own, not copy."
>
> "A creative person is a person who has his own good ideas and can express his thoughts well with different materials."

Most of the students felt that the ideas or products resulting from creative thinking should be unique.

Question four, Do you think you are a creative person?, resulted in a negative response from many subjects. This negative response reflects the lack of self-confidence in many students of this age and indicates a need to work with the students to help them recognize and use their abilities. In Technique Group One, six students responded with yes, seven students with no and three of the students responded that they were undecided. In Technique Group Two only two students

TABLE X

RESULTS OF THE PRE-QUESTIONNAIRE
SEVENTH GRADE ART
TECHNIQUE GROUP ONE
FEBRUARY, 1968

	Question	Yes	No	?	Total
1.	What is a problem? (Narrative analysis page 80)	---	--	-	-----
2.	Do you ever wish you knew how to solve problems more effectively?	15	1	0	16
3.	What do you think it means to be a creative person? (Narrative analysis, page 81)	---	--	-	-----
4.	Do you think you are a creative person?	6	7	3	16
5.	Do you think a person can develop his ability to be more creative?	16	0	0	16
6.	Have you ever had any instruction in how to solve a problem?	10	6	0	16
7.	List what you think the steps are in solving a problem. (Narrative analysis, page 86)	--	--	-	-----

TABLE XI

RESULTS OF THE PRE-QUESTIONNAIRE
SEVENTH GRADE ART
TECHNIQUE GROUP TWO
FEBRUARY, 1968

	Question	Yes	No	?	Total
1.	What is a problem? (Narrative analysis page 80)	---	--	-	-----
2.	Do you ever wish you knew how to solve problems more effectively?	14	1	0	15
3.	What do you think it means to be a creative person? (Narrative analysis, page 81)	---	--	-	-----
4.	Do you think <u>you</u> are a creative person?	2	8	5	15
5.	Do you think a person can develop his ability to be more creative?	15	0	0	15
6.	Have you ever had any instruction in how to solve a problem?	8	7	0	15
7.	List what you think the steps are in solving a problem. (Narrative analysis, page 86)	---	--	-	-----

TABLE XII

RESULTS OF THE PRE-QUESTIONNAIRE
SEVENTH GRADE ART
PROBLEM SOLVING GROUP THREE
FEBRUARY, 1968

Question	Yes	No.	?	Total
1. What is a problem? (Narrative analysis page 80)	---	--	-	---
2. Do you ever wish you knew how to solve problems more effectively?	16	0	0	16
3. What do you think it means to be a creative person? (Narrative analysis, page 81)	---	--	-	---
4. Do you think <u>you</u> are a creative person?	2	6	8	16
5. Do you think a person can develop his ability to be more creative?	14	2	0	16
6. Have you ever had any instruction in how to solve a problem?	13	3	0	16
7. List what you think the steps are in solving a problem. (Narrative analysis, page 86)	---	--	-	---

TABLE XIII

RESULTS OF THE PRE-QUESTIONNAIRE
SEVENTH GRADE ART
PROBLEM SOLVING GROUP FOUR
FEBRUARY, 1968

	Question	Yes	No	?	Total
1.	What is a problem? (Narrative analysis page 80)	---	--	-	----
2.	Do you ever wish you knew how to solve problems more effectively?	12	2	1	15
3.	What do you think it means to be a creative person? (Narrative analysis, page 81)	---	--	-	----
4.	Do you think <u>you</u> are a creative person?	1	10	4	15
5.	Do you think a person can develop his ability to be more creative?	14	1	0	15
6.	Have you ever had any instruction in how to solve a problem?	6	8	1	15
7.	List what you think the steps are in solving a problem. (Narrative analysis, page 86)	---	--	-	----

responded with yes, eight students with no and five were undecided. In Problem Solving Group Three, two students responded with yes, six with no and eight were undecided. In Problem Solving Group Four, one student responded with yes, ten with no and four were undecided.

For question five, Do you think a person can develop his ability to be more creative?, the majority of students in all groups answered yes.

In response to question six, Have you ever had any instruction in how to solve a problem?, over half of the total group of subjects said yes.

The researcher dismissed item seven as being too difficult to assess due to the nature of the question in asking for steps in solving a problem. There were almost as many variations as there were students.

The researcher felt that the pre-questionnaire gave needed insight into the attitudes of the students in the study. Although the data was subjective it was needed to provide clues for development of the problem solving program which could not be gained as well in any other manner.

IV. RESULTS OF THE POST-QUESTIONNAIRE

The post questionnaire was administered to all subjects in order to ascertain any indication of change in attitudes at the end of the testing program. It was hoped that some noticeable changes would occur

to support the research hypothesis. A survey of the questionnaires indicated that the students in the problem solving group showed a noticeable development of positive attitude toward their ability to solve problems. Subjectively these data collection results were the most rewarding and the most significant in indicating support for the investigator's research hypothesis.

Question one, If you were talking to someone who did not feel he was a very creative person--someone who had a hard time thinking up new ideas--what would you say to him to help him?, showed significant contrast in attitude between the technique and problem solving groups. The technique groups responded with vague answers such as:

"Look around."

"Try to think of something interesting."

"Close his eyes and sort of daydream."

While the problem solving group answers showed the influence of the problem solving training:

"To decide what your problem is then go about the steps to solve it."

"I would suggest to him about brainstorming, what it is and how you do it. I would also tell him to cut out pictures from magazines that inspire him."

"Think of something, see what to make it out of, look at other things to get more ideas, experiment with it, also have a lot of confidence."

Question two also shows the vagueness of the technique group

contrasted with the problem solving group. The question: List some ways you know to help you get more new ideas: received the following responses from the technique groups:

"Thinking of things I already know about and adding to them. Letting my mind free."

"Look out the window, put something together."

"Look in books, magazines, and pictures around the room."

While the problem solving groups offered suggestions which were more concrete and that were a result of the special problem solving instruction, in many cases:

"Group brainstorming."

"Brainstorming-single."

"Brainstorm or do some research on other work of its kind. Collect pictures and things that will give you ideas."

"I check the two sheets given to me on finding ideas."

Many of the answers for question three (see Appendix D, for question) were repetitious of the answers in questions one and two, however, it should be noted that in answer to this question a number of students in both technique and problem solving groups mentioned that the Torrance Tests of Creative Thinking booklets had helped them to think more creatively. In addition to this observation it should be noted that problem solving students again listed techniques used in the problem solving instruction such as brainstorming, the idea banks and the idea sheets

as being helpful to them.

Table XIV below shows the tabulated results of question four:

TABLE XIV

RESULTS OF THE POST QUESTIONNAIRES, GROUPS ONE, TWO, THREE, AND FOUR, SEVENTH GRADE ART, APRIL, 1968

Question four: Do you feel you are able to solve art problems more effectively than you could at the beginning of the semester?	Yes	No	Undecided
Technique Group One	14	0	1
Technique Group Two	10	5	1
Problem Solving Group Three	14	1	1
Problem Solving Group Four	12	3	0

The majority of students said yes that they could solve problems more effectively. Written comments by the problem solving students in regard to this question indicated that the problem solving technique instruction had helped them. Sample comments:

"Because I can recognize problems now."

"I have picked up ways of looking at the problem from several angles to solve it."

"Because I didn't know how to get ideas, but now I do."

Questions five and six were dismissed for the purposes of this study as irrelevant to what was being measured.

V. THE PANEL OF ART EXPERTS TO RATE PRODUCTS

The results of the Panel of Art Experts were disappointing. It had been hoped that significant difference would occur between the technique and problem solving groups.

Table XV, page 92, Table XVI, page 93, and Table XVII, page 94, show the results of the scoring for three of the products judged. The tables show the total judges scores for both categories; Creative Imagination and Aesthetic Quality. The criterion for these two qualities is to be found in Appendix E. There are two sets of judges scores indicated. One of the judges, Judge One who was a university design instructor judged the products much higher than the other judges. She had been afraid that she would judge the products too harshly because she was not used to rating products of seventh graders. In order to give the reader a better picture of the scoring results, scores were represented with and without Miss Anderson's scores in the totals. Photographic examples of the three products according to the rating scale steps are to be found in Appendix I. The examples are only for Creative Imagination ratings because of the prohibitive costs involved

in including such pictures. In all the tables the scores are for the totals of both technique groups and both problem solving groups.

In Table XV there is only a two point difference between the technique and problem solving groups with and without Judge One's scores for Creative Imagination. The technique groups held the extra two points while in the Aesthetic Quality category the problem solving student's scores were forty-six points higher for the all judge total. It would appear then that for this product, the Monster Drawings that the Technique groups were slightly more creative, but that their work was not as artistically significant as the work done by the problem solving groups.

Table XVI shows the scores for the Texture Relief ratings. The totals indicate that the problem solving classes were significantly lower in both creative imagination and aesthetic quality categories. The Technique groups were forty-four points higher in the Creative Imagination category and thirty-eight points higher in the Aesthetic Quality category.

Table XVII shows the scores for the Poster project. The problem solving groups were fourteen points higher in the Creative Imagination category and the technique groups were thirty-three points higher in the Aesthetic Quality category.

The conclusions to be drawn from the Panel of Art Experts are

TABLE XV

TOTAL SCORES FOR PANEL OF ART EXPERTS RATINGS OF MONSTER DRAWINGS FOR CREATIVE IMAGINATION AND AESTHETIC QUALITY, APRIL, 1968

Groups	Creative Imagination		Aesthetic Quality	
	All Judges	Judges 2, 3, 4	All Judges	Judges 2, 3, 4
Technique	497	352	462	319
Problem Solving	495	354	508	358

TABLE XVI

TOTAL SCORES FOR PANEL OF ART EXPERTS RATINGS OF TEXTURE RELIEFS FOR CREATIVE IMAGINATION AND AESTHETIC QUALITY, APRIL, 1968

Groups	Creative Imagination		Aesthetic Quality	
	All Judges	Judges 2, 3, 4	All Judges	Judges 2, 3, 4
Technique	622	465	592	437
Problem Solving	578	419	554	410

TABLE XVII

TOTAL SCORES FOR PANEL OF ART EXPERTS RATINGS OF POSTERS FOR CREATIVE IMAGINATION AND AESTHETIC QUALITY, APRIL, 1968

Groups	Creative Imagination		Aesthetic Quality	
	All Judges	Judges 2, 3, 4	All Judges	Judges 2, 3, 4
Technique	488	342	473	324
Problem solving	502	329	440	290

related to the fact that the products were so different that it is almost impossible to make statements of correlation in regard to what occurred. For the purposes of the study the Panel of Art Experts was considered a failure.

VI. CROSS REFERENCE ANALYSIS OF DATA

Four methods of data collection were used in the study; The Torrance Tests of Creative Thinking, Tabulation of Thumbnail Sketches, Pre- and Post Questionnaires and the Panel of Art Experts. Two of the four methods were found to support the researcher's hypothesis. Two of the methods did not support the researcher's study expectations. There was evidence particularly in the results of the Torrance Tests of Creative Thinking and the Tabulation of Thumbnail Sketches that the groups were not truly equal in ability level. Technique group two regressed on both the Torrance Tests and the Tabulation of Thumbnail Sketches. No factor the researcher can cite accounts for the high scores on the pre- tests and first Thumbnail Sketches in group two and their low scores later in the study. It is difficult to compare the data collection methods because they were not comparable enough and they were measuring in ways difficult to equate.

CHAPTER V

SUMMARY AND CONCLUSIONS

I. SUMMARY

The purpose of this study was to create an art program for seventh grade students to strengthen self-confidence in creative ability and to increase the fluency of ideas through special instruction in problem solving techniques.

A survey of literature in the areas of creativity, problem solving and adolescent art education was made. Only a small amount of the research was found to deal directly with the problem solving at the junior high school level, although much of the research could be modified for suitable application at this level.

A testing program using sixty-two seventh grade art students was carried out at Central Junior High School in Ames, Iowa for eight and one-half weeks. The subjects were members of four regular art classes taught by the researcher. There were either fifteen or sixteen students in each class or group. Two of the groups served as control groups and were called technique groups. Two of the groups served as experimental groups and were called problem solving groups. Only the problem solving groups were given instruction in problem solving techniques such as: brainstorming, checklisting and attribute listing.

Four data collection methods were used: (1) The Torrance Tests of Creative Thinking, Figural A and B, used respectively for pre- and post tests for all subjects. (2) Pre- and post questionnaires devised by the researcher to assess attitudes toward creativity and problem solving. (3) Tabulation of Thumbnail Sketches for three of the projects. (4) A Panel of Art Experts to rate products done by the subjects during the testing period.

Data was analyzed through tables and narrative description and conclusions will be drawn as to significance of the findings. Suggestions will be made for further research.

II. CONCLUSIONS

The researcher felt that the study provided valuable clues for improving art programs at the junior high school level. While the objective evidence was disappointing because it failed to show the expected gains, the subjective evidence shown in the pre- and post questionnaires, was encouraging.

In evaluating the study the researcher felt that it was worthwhile. The students benefited from the instruction in problem solving. The techniques used with the problem solving students helped them to "get started" on art problems rather than sitting nervously, waiting for ideas to come to them. Through observation; conversation with the students

and through analyzing the post questionnaires, the researcher thought that the students were aware of the help they had obtained, and were pleased with being able to use their creative abilities more easily. They gained an awareness of the necessity of a systematic approach to problem solving and put this knowledge to work. They became better able to isolate problems and analyze the factors they had to work with at the beginning of the attempt to solve them. The sheets, "Some Questions to Ask Yourself When Solving an Art Problem," were helpful to them in that they helped the students think for themselves.

The study emphasizes the fact that taking time to adequately prepare for the art experience helps the student grow in self-confidence. Junior high school art teachers tend to spend time preparing materials, giving demonstrations, and motivating the students toward the final product, but often do not allow the students enough time to think creatively about the problems at the beginning of assignments. By time to "think creatively," the researcher means time to view a problem from several viewpoints and to apply some of the idea spurring techniques discussed in this field report. The student is too often left to sit and wait for an idea to "strike" him, during which time he may very well become frustrated and discouraged. It is during this type of experience that the researcher feels many of the blocks to creativity build up and it was this that the investigator sought to modify.

One of the techniques found to be of the most use in getting the students to think, was brainstorming. They were very receptive to this technique and from the beginning participated in it with much enthusiasm. It is interesting to note that even the most quiet and inhibited students participated in contributing ideas when the problem solving groups brainstormed the question: "How many uses can you find for a pencil?" Many of the students individually brainstormed successfully.

One of the weak points of the study was that the Torrance Tests of Creative Thinking did not show what was expected. Both the analysis of the raw data in Tables II, III, IV, and V; and the statistical analysis, which was discarded because it showed no correlations between the pre- and post tests above chance level, failed to establish any patterns upon which the investigator can hypothesize. The reason the tests failed to show gains or any set patterns may be due to the scoring difficulties mentioned earlier. The researcher definitely felt that the pre- and post test Activity Three were not comparable. Also a great deal of subjective judgment was required in assigning points in Activity Three of the Post test because of the frequent combining of circles rather than the use of each circle to create an idea. The tests were found to contain important evidence that the class groups differed greatly in abilities.

The Panel of Art Experts did not show hoped for gains, either in creative imagination or aesthetic quality. Some gains were noted in the

total problem solving groups, but generally this method was a failure. One reason the Panel of Art Experts was not successful may be the need for a longer judges training session in order to insure that the judges are thinking enough in similar terms. Though the criterion for judging was discussed, there was not time to judge sample work and discuss and compare results. Even though an independent judgment was desired, additional training might have strengthened the reliability of the judgments. The biggest prohibitive factor in adequately training judges for a classroom study of the type engaged in are money and time to get the judges together.

The researcher felt that the following statements could be made about the study:

1. Instruction in problem solving techniques has a positive effect on the creative confidence of seventh grade art students.
2. The sheets, "Questions to Ask Yourself About an Art Problem," was helpful to problem solving students to whom it was given and would be an asset used in other junior high school art classes at other levels.
3. Though it was impossible to verify statistically, the most rewarding findings came from the subjective commentary by the problem solving students in the post questionnaire.
4. As the students became familiar with the art program during

the semester, the total research population showed some growth in attacking art problems. The thumbnail sketch tabulations and the observed classroom performance of the students support this finding.

5. Efforts behind the rating scale used by the Panel of Experts failed to achieve the gains expected, so was considered a failure.
6. Results of the Torrance Tests of Creative Thinking were not reliable for this test due to unknown factors resulting in scores which were below chance level.
7. Teaching of problem solving techniques in the art classroom correlates with efforts in art education to release creativity in children and should be encouraged for implementation not only in junior high school but at other levels as well.

III. LIMITATIONS OF THE STUDY

Several limitations of this study were as follows:

1. The number of subjects tested was sixty-two.
2. The eight and one-half week length of the study might better have been one or two full semesters.
3. The study was limited to one school in one geographical area.
4. The study was limited to one grade level. It would be interesting

and significant to use the study with all three grade levels in the junior high school to see how the results might differ at each level.

IV. IMPLICATIONS FOR FURTHER RESEARCH

This study resulted in clues to further research which is needed in art education. Some of the need for research was recognized in the following areas:

1. Much more research needs to be related specifically to problem solving techniques taught to increase self-confidence and creativity in junior high school students.
2. Greater awareness is needed by art educators about current knowledge of procedures proven successful in helping increase creative ability.
3. Further research needs to be done in regard to the development of idea fluency.
4. Additional attention needs to be given to the relationship between quantity and quality in the ideas produced.
5. More research in junior high school needs to be carried out to investigate the characteristics of a teacher best suited to foster creative growth.

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APPENDIXES

APPENDIX A

APPENDIX A

RESEARCH CALENDAR

Week 1

February	19	Pre-Test
	20	Pre-Test
	21	Introduction to Problem Solving Lectures and questionnaires for Problem Solving Groups.
	22	Wash and Ink drawings and questionnaires for Technique Groups.
	23	T TH F Groups (both T. and P.S.) Texture Relief introduction.

Week 2

February	26	Texture relief introduction.
	27	Texture reliefs
	28	Texture reliefs
	29	Texture reliefs
March	1	M W F Texture reliefs

Week 3

March	4	Texture reliefs
	5	Texture reliefs
	6	Texture reliefs
	7	Texture reliefs
	8	T TH F Texture reliefs

Week 4

March	11	Texture reliefs
	12	Texture reliefs
	13	Texture reliefs
	14	Watercolor poetry illustration
	15	M W F Watercolor poetry illustration

Week 5

March	25	Watercolor poetry illustration
	26	Watercolor poetry illustration
	27	Watercolor poetry illustration
	28	Watercolor poetry illustration
	29	T TH F Watercolor poetry illustration

Week 6

April	1	Posters
	2	Posters
	3	Posters
	4	Posters
	5	M W F Posters

Week 7

April	8	Posters
	9	Posters
	10	Posters

April	11	Posters
	12	Good Friday - no school

Week 8

April	15	Introduction to masks
	16	Introduction to masks
	17	Introduction to masks
	18	Introduction to masks
	19	M W F Masks

Week 9

April	22	Masks
	23	Masks
	24	Post Tests and Questionnaires
	25	Post Tests and Questionnaires
April	28	Panel of Art Experts

Total Number of class sessions:

M W F Classes, twenty-one sessions

T TH F Classes, twenty-two sessions

APPENDIX B

APPENDIX B

PROGRAM CONTENT OUTLINE

Technique Group (control)	Problem Solving Group (Experimental)
Experiences:	Experiences:
Pen and ink drawing Monster drawings Watercolor poetry Illustrations Posters Masks Texture Reliefs Cut letter designs	Monster drawings Watercolor poetry Illustrations Posters Masks Texture Reliefs Cut letter designs Problem solving lectures Discussion of style in art Handed out ditto sheets to use in regard to questioning Keeping of idea books and idea banks
Motivation:	Motivation:
Materials Demonstrations Resource materials (photographs, etc.)	Student interests Questioning attitude of inquiry Development of curiosity Development of self-confident attitude Demonstrations Appropriate resource materials
Emphasis:	Emphasis:
On doing of the art work without deliberate questioning attitude On technique On materials On student interests	On making the student aware of the creative process as it relates to his work and on developing an attitude in the students which was based on questioning. On original creative ideas

APPENDIX C

APPENDIX C

PRE-QUESTIONNAIRE

Name_____

Period & Days_____

Date_____

1. What is a problem?

2. Do you ever wish you knew how to solve problems more effectively?

   Yes____

   No ____

   Comments:

3. What do you think it means to be a creative person?

4. Do you think <u>you</u> are a creative person?

   Yes____

   No ____

   Explain why you answered as you did?

5. Do you think a person can develop his ability to be more creative?

   Yes____

   No ____

6. Have you ever had any instruction in how to solve a problem?

Yes____

No ____

7. List what you think the steps are in solving a problem:

APPENDIX D

APPENDIX D

POST QUESTIONNAIRE

Name_____

Period & Days_____

Date_____

1. If you were talking to someone who did not <u>feel</u> he was a very creative person--someone who had a hard time thinking up new ideas--what would you say to him to help him?

2. List some ways <u>you</u> know to help <u>you</u> get more new ideas:

3. Has anything we have done so far this semester helped you have more ideas when confronted with an art problem? What?

4. Do you feel you are able to solve art problems more effectively now than you could at the beginning of the semester?

   _____Yes

   _____No

   Why or why not?

5. Which projects have you liked best so far and why?

6. What kinds of projects would you like to do that we have not done so far?

APPENDIX E

APPENDIX E

Name_____

Period and Days_____

Some questions to ask yourself when solving an art problem:

1. What is the problem I am to solve? - clarify the problem to be solved in your mind.

2. What materials and resources do I have to work with? Is the assignment limited to specific materials? If I can add other items--where shall I be able to look for them? What everyday items from home might I use to solve the art problem?

3. Have I remembered that I can look at the problem from more than one viewpoint? Have I tried some "individual brainstorming" to try to get a new outlook on the problem?

4. What are some possible solutions to the task at hand? Try one. Did it work? If it did not turn out successfully how willing am I to try again? How many solutions am I willing to try? What does the old quotation- "If at first you don't succeed, try, try again," have to say to me in this situation?

5. Does this art product express me?
   Is the work I am doing on the problem meaningful to me?
   Is the art work an expression of how I see and what I feel about the world?

6. Have I been true to the materials? Have I done the best job learning as much about the particular art materials I am using, I can?

Further questions I can ask myself about my art work:

APPENDIX E

IDEA SPURRING QUESTIONS

PUT TO OTHER USES? New ways to use as is? Other uses if modified?

ADAPT? What else is this like? What other ideas does this suggest?

MODIFY? Change meaning, color, motion, sound, odor, taste, form, shape? Other changes?

MAGNIFY? What to add? Greater frequency? Stronger? Larger? Plus ingredient? Multiply?

MINIFY? What to subtract? Eliminate? Smaller? Lighter? Slower? Split up? Less frequent?

SUBSTITUTE? What else instead? Who else instead? Other place? Other time?

REARRANGE? Other layout? Other sequence? Change pace?

REVERSE? Opposites? Turn it backward? Turn it upside down? Turn it inside out?

COMBINE? How about a blend, an assortment? Combine purposes? Combine ideas?

Adapted from Alex Osborn's
Applied Imagination checklisting idea.

APPENDIX F

APPENDIX F

EXAMPLES USED IN DISCUSSION OF STYLE IN ART

Session 3: Problem Solving Group

1. Picture in color of Allee, a new mural by Stuart Davis painted in 1955, which hangs in the Central Dining Hall at Drake University in Des Moines, Iowa.

2. Selected Artists 1967

   Catalogue of an exhibit at the Des Moines Art Center, December 8, 1967 to January 7, 1968.

3. Five Book Series:

   Modern Painting I, II, III, IV, V. (Books, 73, 74, 75, 76, and 77.)

   Tudor Publishing Company
   New York, 1965.

   I. Manet to the Neo-Impressionists
   II. Gauguin to the Fauves
   III. Expressionists to Surrealists
   IV. Cubists to Early Abstract Painters
   V. Abstract Painting

4. Photograph of artist Marc Chagall sketching in his garden.

5. The Story Behind the Painting, Garden City, New York: Published by Cowles Magazines and Broadcasting Company, Inc., 1962.

APPENDIX G

APPENDIX G

Read the following poem carefully and picture in your mind what you think it represents. Illustrate your impressions of this poem in color using materials you feel will best express your idea.

The Flag Goes By

Hats off!
Along the streets there comes
A blare of bugles, a ruffle of drums,
A flash of colour beneath the sky:
Hats Off!
The flag is passing by!

Blue and crimson and white it shines
Over the steel-tipped, ordered lines.
Hats off!
The colours before us fly;
But more than the flag is passing by.

Sea-fights and land-fights, grim and great,
Fought to make and to save the State:
Weary marches and sinking ships;
Cheers of victory on dying lips.

Days of plenty and years of peace;
March of a strong land's swift increase;
Equal justice, right and law,
Stately honour and reverend awe;

Sign of a nation, great and strong
Toward her people from foreign wrong:
Pride and glory and honour, -all
Live in the colours to stand or fall.

Hats off!
Along the street there comes
A blare of bugles, a ruffle of drums;
And loyal hearts are beating high;
Hats off!
The flag is passing by!

-Henry Holcomb Bennett-

APPENDIX H

APPENDIX H

Criterion Notes for Judging Products
(What you are looking for)

Creative Imagination Category

You are looking for the degree of self-expression in the child's work which reflects his thoughts concerning what he is doing. The technical quality of the piece of work is not to be considered in this particular category, only the idea communicated. This is to be looked at as a product of the creative process of generating and communicating ideas visually. This category also includes unique uses of the art materials.

Aesthetic Quality

You are looking for the aesthetic soundness of this product. You will be judging it for such things as good composition, use of color, unified design, balance, etc. You will look for the handling of the materials in a technically pleasing manner. You should judge the product on its aesthetic quality which may in some ways be a judgment as to your opinion about how well the student has displayed the rather intangible feeling of a good product.

Definition of Terms

Creativity--Creativity for this study was defined as the freedom of the student to put his own ideas and views of his world into a unique visual form. The communication to be termed creative for the purposes of this study must be a product of the individual's own perceptions of his environment and his feeling for the divergent potentials of his materials.

APPENDIX H

RATING SCALE

This scale is for both categories, creative imagination and aesthetic quality. The scale is a seven point scale. Begin by looking at all of the products in a group briefly, then assign each product a rating.

1 is low and 7 is high (best)

THE RATING SCALE

1 - Low

2 - Below average

3 - Average-

4 - Average

5 - Average+

6 - Above average

7 - High

APPENDIX H

JUDGES RATING SHEET

Rater_____

Product _____

Group 1 2 3 4 (circle one)

Product Code #	Rating- Creative Imagination	Product Code #	Rating- Aesthetic Quality
	Group code #'s 1 47-62 2 32-46 3 17-31 4 1-16		

APPENDIX I

PHOTOGRAPHS OF MONSTER DRAWINGS

RATED FOR

CREATIVE IMAGINATION

Figure 9. Example of a Monster Drawing Rated Seven or Highest for Creative Imagination on the Product Rating Scale.

Figure 10. Example of a Monster Drawing Rated Six for Creative Imagination on the Product Rating Scale.

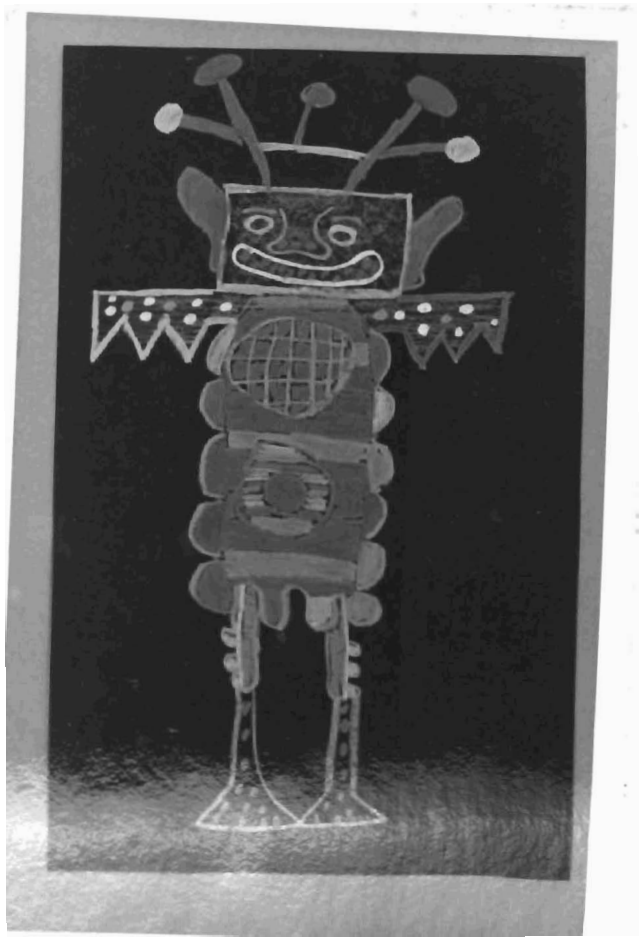

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Figure 11. Example of a Monster Drawing Rated Five for Creative Imagination on the Product Rating Scale.

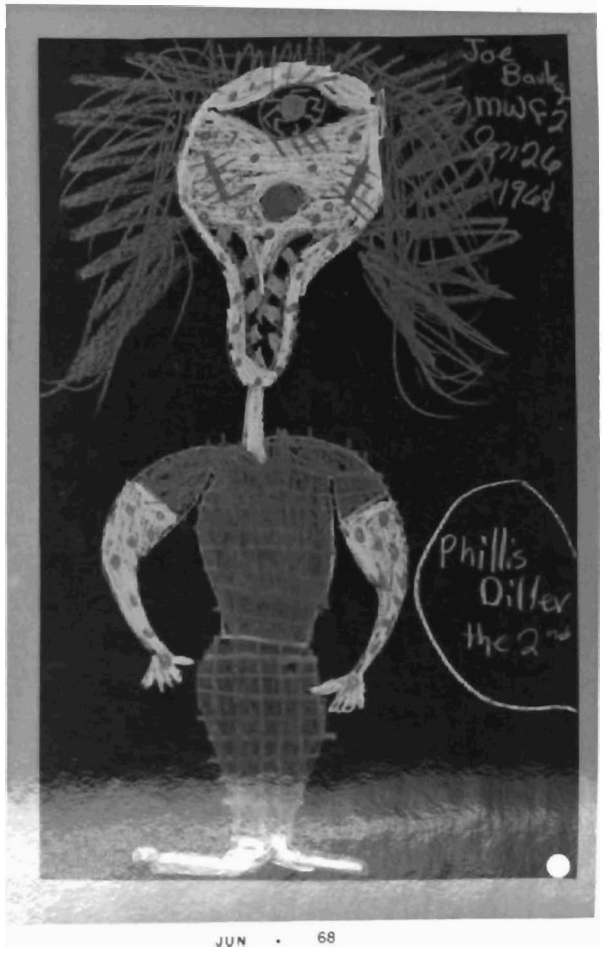

Figure 12. Example of a Monster Drawing Rated Four for Creative Imagination on the Product Rating Scale.

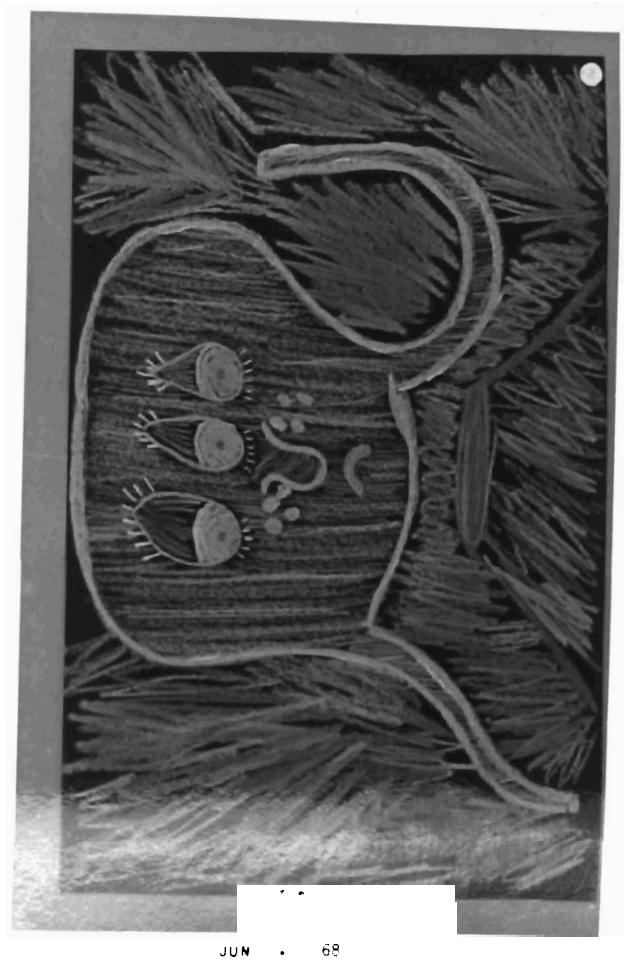

Figure 13. Example of a Monster Drawing Rated Three for Creative Imagination on the Product Rating Scale.

Figure 14. Example of a Monster Drawing Rated Two for Creative Imagination on the Product Rating Scale.

Figure 15. Example of a Monster Drawing Rated One, or Lowest for Creative Imagination on the Product Rating Scale.

PHOTOGRAPHS OF TEXTURE RELIEFS

RATED FOR

CREATIVE IMAGINATION

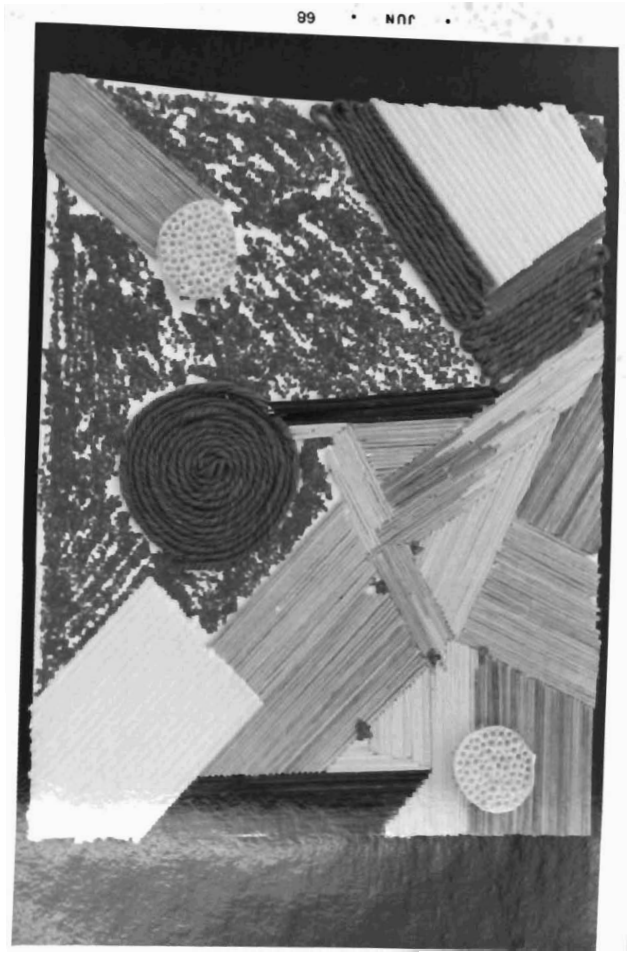

Figure 16. Example of a Texture Relief Rated Seven, or Highest for Creative Imagination on the Product Rating Scale.

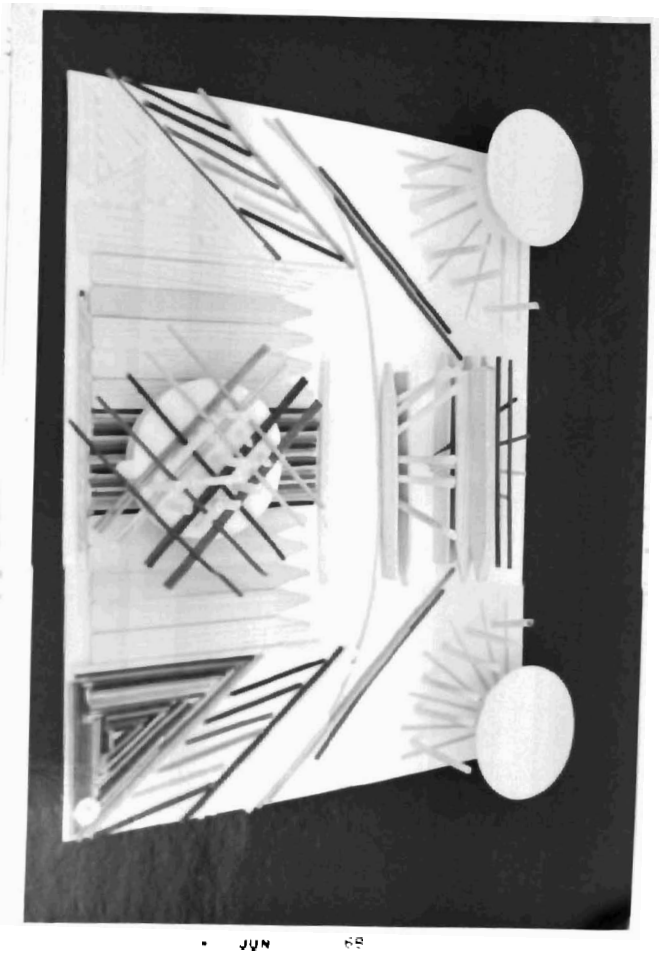

Figure 17. Example of a Texture Relief Rated Six for Creative Imagination on the Product Rating Scale.

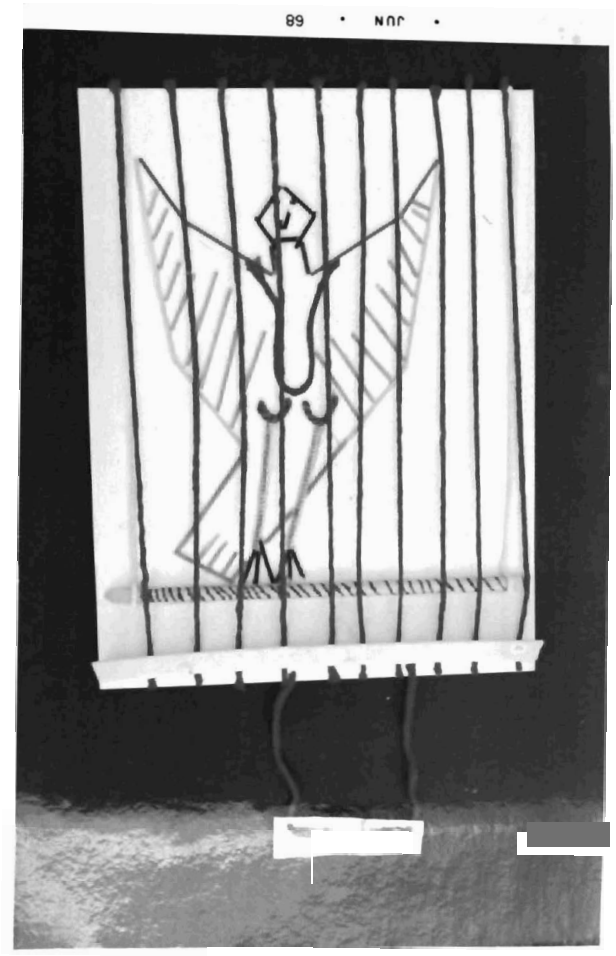

Figure 18. Example of a Texture Relief Rated Five for Creative Imagination on the Product Rating Scale.

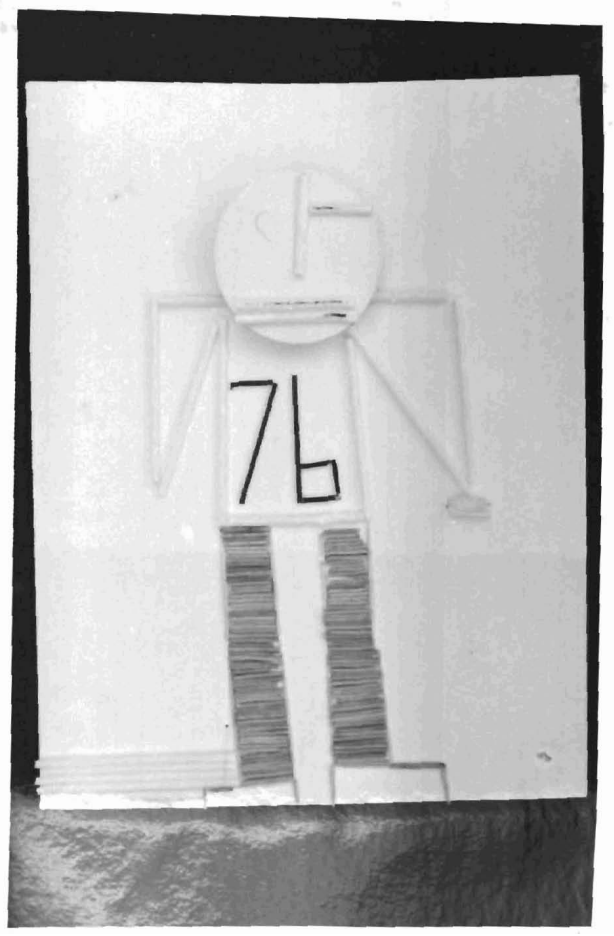

Figure 19. Example of a Texture Relief Rated Four for Creative Imagination on the Product Rating Scale.

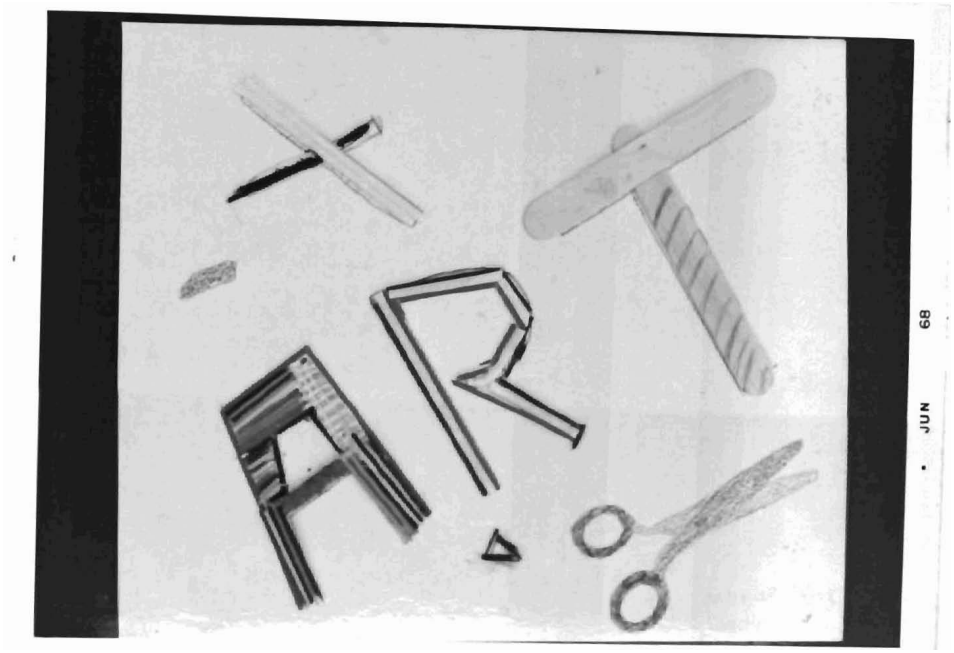

Figure 20. Example of a Texture Relief Rated Three for Creative Imagination on the Product Rating Scale.

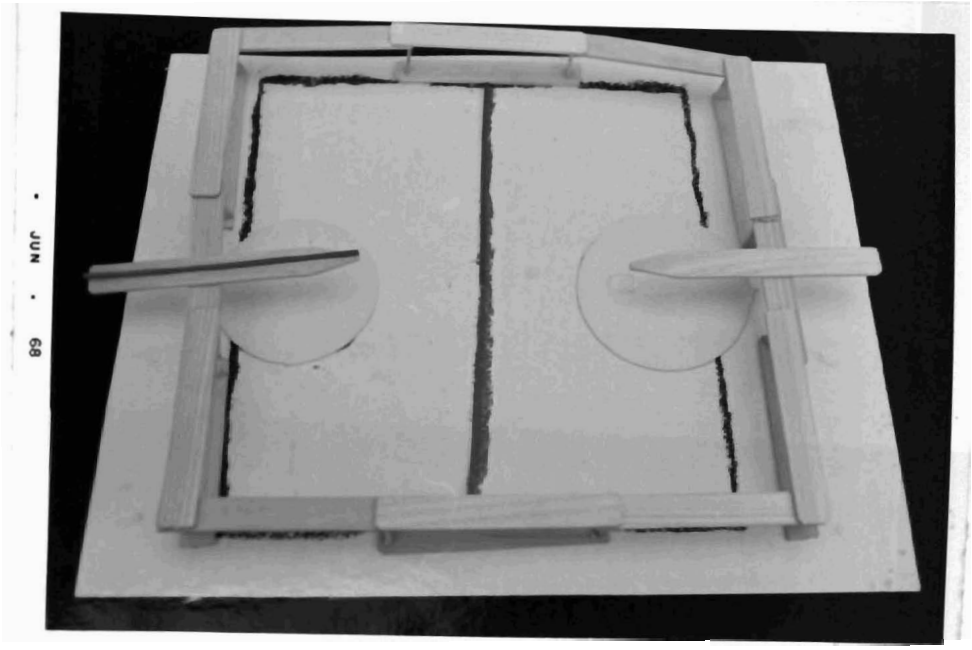

Figure 21. Example of a Texture Relief Rated Two for Creative Imagination on the Product Rating Scale.

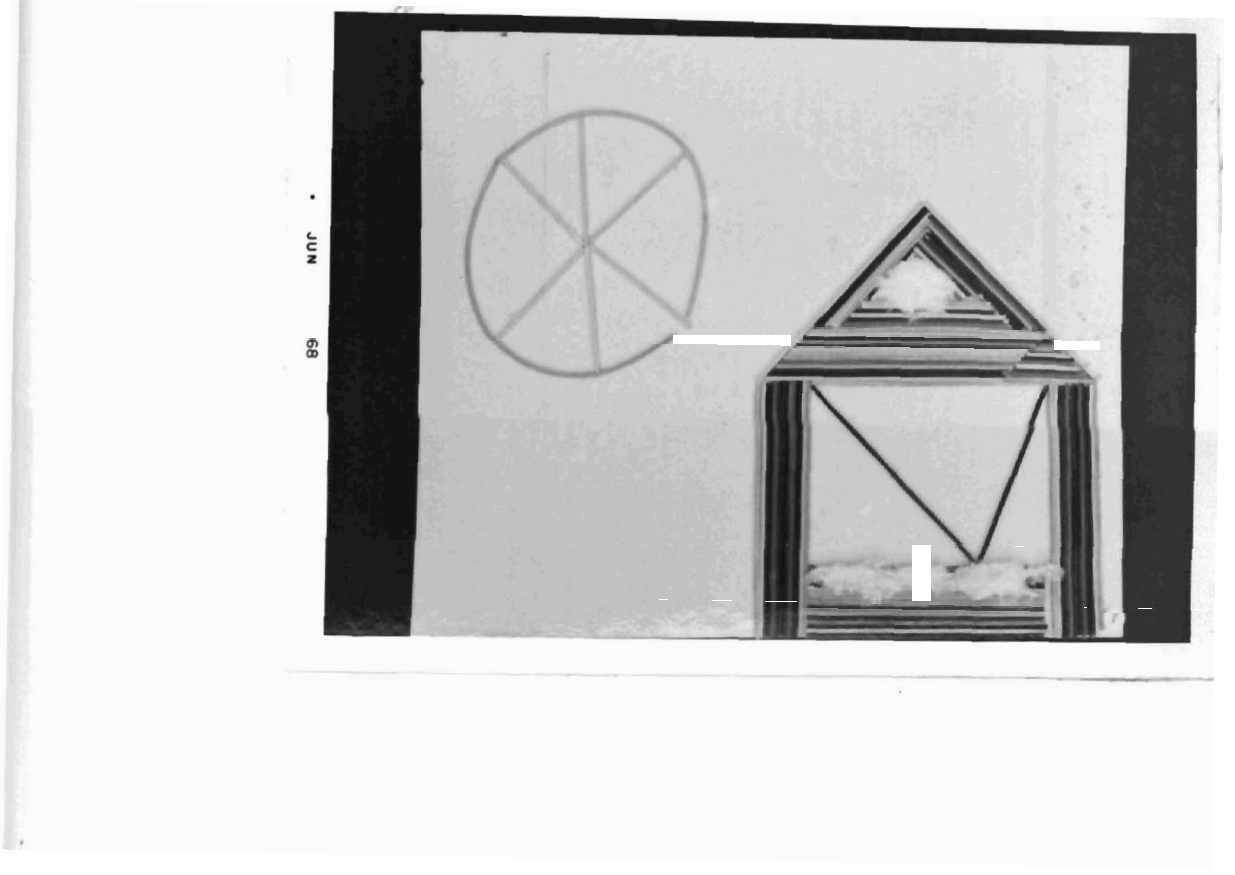

Figure 22. Example of a Texture Relief Rated One, or Lowest for Creative Imagination on the Product Rating Scale.

PHOTOGRAPHS OF POSTERS

RATED FOR

CREATIVE IMAGINATION

Figure 23. Example of a Poster Rated Seven, or Highest for Creative Imagination on the Product Rating Scale.

Figure 24. Example of a Poster Rated Six for Creative Imagination on the Product Rating Scale.

Figure 25. Example of a Poster Rated Five for Creative Imagination on the Product Rating Scale.

Figure 26. Example of a Poster Rated Four for Creative Imagination on the Product Rating Scale.

Figure 27. Example of a Poster Rated Three for Creative Imagination on the Product Rating Scale.

Figure 28. Example of a Poster Rated Two for Creative Imagination on the Product Rating Scale.

Figure 29. Example of a Poster Rated One, or Lowest for Creative Imagination on the Product Rating Scale.

APPENDIX J

Georgia Studies of Creative Behavior
185 RIVERHILL DRIVE
ATHENS, GEORGIA 30601

I appreciate very much your recent inquiry concerning some of my past research or some of the testing or instructional materials that I have been involved in developing. The volume of such inquiries is such that I cannot possibly answer each one nor supply much of the material requested. Wherever possible or appropriate I am enclosing lists of publications, announcements of the availability of materials, available reprints, and the like.

Most of the completed studies of creative behavior have been incorporated into the following three books available from their publishers:

1. Guiding Creative Talent, Prentice-Hall, Inc., Englewood Cliffs, N.J.
2. Education and the Creative Potential, University of Minnesota Press, Minneapolis, Minn.
3. Rewarding Creative Behavior: Experiments in Classroom Creativity, Prentice-Hall, Inc., Englewood Cliffs, N. J.

The instructional materials developed by Myers, Cunnington, and me are available from the regional sales offices of Ginn and Company and the tests of creative thinking ability, scoring guides, technical-norms manual, and examiner's kit are available from Personnel Press, Inc., 20 Nassau Street, Princeton, N.J. 08540.

It will be some time before I can assume any additional speaking engagements, workshop assignments, or writing assignments. I have just assumed the chairmanship of the Department of Educational Psychology here at The University of Georgia and my teaching, advising, and administrative duties will be fairly heavy, along with the problem of becoming acquainted with a new and rapidly growing university and community. I have also assumed advisory editorial responsibilities to three professional journals and an office in one national professional organization. I also have an overwhelming backlog of uncompleted and long overdue research and writing contracts that must be given the highest priority possible.

Again, let me assure you that I appreciate your interest and wish you the greatest success in achieving the goal of a more humane kind of education.

Sincerely,

E. Paul Torrance

E. Paul Torrance

UNIVERSITY OF SOUTHERN CALIFORNIA
UNIVERSITY PARK
LOS ANGELES, CALIFORNIA 90007

DEPARTMENT OF PSYCHOLOGY
APTITUDES RESEARCH PROJECT

FORD, DIRECTOR
NER, ASSISTANT DIRECTOR

November 27, 1967

Miss Mariel Neu
Delores Apartments #104
209 South Oak
Ames, Iowa 50010

Dear Miss Neu:

It is difficult to advise you as to which of our tests of creative abilities would be most suitable for your research problem.

In my book you will notice that there are a number of divergent-production abilities for dealing with visual-figural information and a number of parallel abilities for dealing with semantic information. I would guess that your interest is creativity in production of art and that probably your training in problem solving is largely semantic. You might therefore be interested in determining the gain in both respects. You should expect more gain in semantic abilities and some, but less, in figural abilities. I think you would profit by reading the report of a dissertation by C.A. Jones (reference given in my book), in which he dealt with both semantic and figural creative abilities.

I am sending enclosed a copy of our Report No. 36, which lists the recommended tests for each ability and tells where they may be obtained, also a test catalog to inform you about which tests are available from the publisher and their prices. In case you wish to use unpublished tests that we have, please use the enclosed test-request forms. We would send you sample copies of tests that you wished to reproduce and use for your research study.

For most tests there is only one form, but in those case the tests are in parts, and you could use different parts for pre and post testing. There are alternate forms available for Alternate Uses, Associational

Fluency, and Consequences. In ordering any of these particular tests, if you do, be sure to ask for the two forms. You would need to have a qualified purchaser of tests sponsor your order.

Sincerely,

Enc: Report 36
Test catalog
Request form

J. P. Guilford

JPG: js